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The Case for the Electromagnetic Commons

An Ecocultural Intervention in Australian Spectrum Management

Scott Smith

A Thesis Submitted in Partial Fulfilment of the
Requirements for the Award of
Bachelor of Arts (Honours) Media Studies
At the Faculty of Communications, Health and Science,
School of Communications and Multimedia
Edith Cowan University
2001

ABSTRACT

In the globalised world of the electronic, information age, there is one resource that increasingly appears to play a pertinent role in the future of our communications systems. The electromagnetosphere is an ecological region that is largely unacknowledged outside of scientific circles: it is one of those naturally-occurring phenomena that we simply take for granted. But with developments in communications technology we have learnt to tap the energies of this natural phenomenon, and in turn have developed a complex system of management and regulation where a 'property-mimicking' regime of allocation and licensing is in place. There are movements however, to make the final conversion of 'spectrum space' into the private hands of media and telecommunications corporations. What effect will this have on our notions of citizenship and democracy? How will this alter our relationship to these corporations, to the electromagnetosphere itself, and our wider relationship within the natural world?

Yet there are further complexities in our relationship with the electromagnetosphere as citizens and through government. How do we manage something which is largely invisible to the naked eye? What are the implications of applying the 'property-mimicking' regimes of land to an ecological sphere which is clearly not solid space? And to what extent is the management and regulation of the electromagnetosphere driven by the dominant trends of 'enclosure' and 'privatisation' that are characteristic of landed property? These are some of the questions that stimulate this research.

By promoting an ecological and cultural dimension to 'spectrum management' - an ecoculturalist methodology - this study aims to wrestle the managerial reins of government, regulators, technologists and economists, away from their narrow and anthropocentric world-views, and reclaim the electromagnetosphere for our communities and ecologies. While our conceptualisation of the electromagnetosphere continues to be based on propertied relations, this research will argue that a 'commons property regime' would be the most appropriate for accommodating the wider democratic and ecological concerns of our communities. This is therefore an intervention and an argument for the 'electromagnetic commons'.

DECLARATION

I certify that this thesis does not, to the best of my knowledge and belief:

(i) incorporate without acknowledgement any material previously submitted for a degree or diploma in any institution of higher education;

(ii) contain any material previously published or written by another person except where due reference is made in the text; or

(iii) contain any defamatory material

Signed

Date 20-12-01

ACKNOWLEDGEMENTS

I would like to thank my supervisor Dr Rod Giblett for his time and patience in overseeing this thesis to its completion. Throughout this journey, Rod's calming presence, insightful and extensive knowledge, and critical commentary has proved invaluable to this study, and his confidence in my ability and my work is something for which I will always be grateful.

I would also like to acknowledge the support of Dr Lelia Green who commented on an earlier version of this research, and always displayed a willingness to assist me both as an undergraduate and during the preparation of this thesis. I must also thank Mark Brennan and Dr Alan McKee, for without their encouragement as an undergraduate, it is unlikely I would have come this far. Furthermore, I thank my colleagues and friends here at Mt Lawley - particularly Steven McKiernan, Jean Burton, Dennis Woods and Jack Seddon - for providing advice, support, opportunities, good humour, and a great environment to be working within.

Finally, this project would never have been completed without the love and support of my family and close friends over the last six months. For your unconditional friendship and love, and your encouragement and patience, I am forever thankful.

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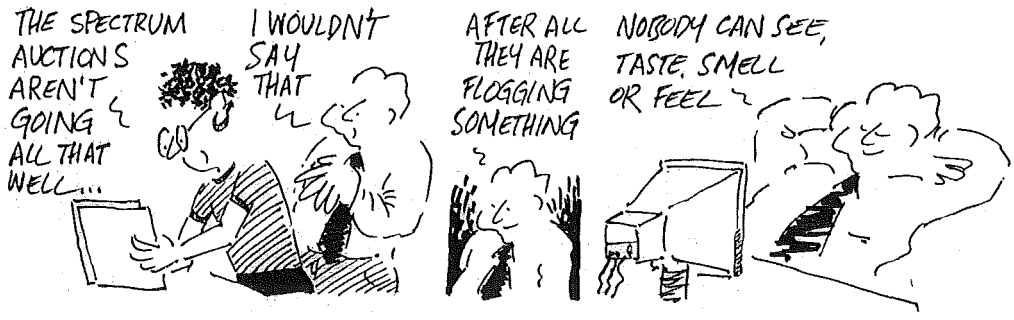

The Spin by Lindsay Foyle
The Australian IT, March 20 (2001), p.32.

INTRODUCTION

This comic strip by Lindsay Foyle appeared in The Australian as the 3G spectrum auctions were coming to a close. The comic strip serves as an excellent text for introducing an analysis of spectrum management in Australia. Firstly, it implies that in broad economic terms the auctions process is seen as faltering: they 'aren't going all that well'. Secondly, it demonstrates the blunt end of the auctions regime: they are literally 'flogging' the spectrum to the highest bidder. Thirdly, and most incisively, the electromagnetic spectrum is 'something nobody can see, taste, smell or feel'. In one insightful swoop of his pen, Foyle raises and encapsulates some intriguing discrepancies in the Australian government's approach to managing what Levin (1971) has called 'the invisible resource', as only a cartoonist can. It is partly these insights which have inspired the research that follows.

At a deeper level, this study sets out to unravel the complexities of managing and regulating arguably the most unique and valuable 'resource' of the globalised, electronic age. By bringing together for the first time a range of writers who have discussed the electromagnetic spectrum - from the technological, legal and economic arguments of Eli Noam, Harvey Jassem and Yochai Benkler, to the composed internationalist feel of Jeremy Rifkin, to the Australian commentary of Trevor Barr and Stewart Fist – this research will attempt to chart a constellation of knowledge and critical analysis. The unifying element to this collection will be the ecocultural

insights of Rod Giblett and others within the ecology movement, who position the discussion more in terms of the electromagnetosphere, rather than the economic abstraction of 'spectrum'.

I will argue that the electromagnetosphere - or 'the airwaves', 'the radiofrequencies', or 'spectrum' - requires an immediate reconstitution of its role as an important conduit to democracy and citizenship. This is because the electromagnetosphere is subject to a 'property-mimicking' regime of allocation and licensing that is increasingly shifting towards 'enclosure', or 'privatisation'. By recognising it as a vital ecological and cultural region of our times, we must 'decolonise' and 'deterritorialise' the electromagnetosphere as part of the wider reclamation of all ecological realms of earth (Giblett, 1997, p.131). This, I will argue, can be achieved through the counter-concept of 'the commons', or the 'common property regime'.

By definition, this research is intrinsically cross-disciplinary as 'spectrum management' involves and attracts a broad range of interests - from government, regulatory bodies, technologists and media and telecommunications corporations, to economists, property rights specialists, communications policy analysts, and environmental resource managers, and, tentatively, cultural commentators and ecologists. Ultimately, it will be impossible to canvass the entire range of issues and complexities within this research, but a sincere effort has been made to acknowledge and engage with this diverse range of views. Moreover, there are areas that are not covered in this study that probably should be, such as the legitimate concerns of community broadcasters and the equally important concerns of environmental health organisations who study modern communications technologies. With this in mind, what follows then is a much needed ecological and cultural - an ecocultural - intervention in the discussion of a 'resource' which is rarely given much thought outside of the few areas of expertise, but is inherently an important conduit of the Australian communications system of the future.

Chapter One The Electromagnetosphere: Conduit of Culture and Communication

Throughout history humans have always utilised naturally occurring phenomena to communicate with each other. The harnessing of the electromagnetosphere for communications has a precedent in earlier conduits for communication: fire, tides, wind, and the animal world. These conduits are channels of energy unique to our bioregions that we have sought to master, to facilitate movement of knowledge and technology, ideas and inventions. In turn, they collapse our sense of time and distance, and reorientate our sense of place in the world. Most importantly however, these conduits are shared: as natural phenomena they are common to earthly life. The histories of communication (and transportation) are mixed narratives of mastery and appropriation, of human ingenuity and inventiveness, and inevitably, of a changing relationship to the natural world. At a deeper level though, these are narratives of reliance and dependence: it is our communication conduits that bind us to the natural world. Jagtenberg and McKie's maxim that 'all communication is biospheric in action' is certainly relevant here (1997, p.2).

In this section I will attempt to trace a brief history of the electromagnetosphere from scientific discovery to critical cultural 'resource'. Some central questions frame this introduction. What differentiates 'the invisible resource' from other 'resources'? What key agents shape this conversion to 'resource' and the 'management' that follows? What assumptions and ideological positions underlie the rhetoric of 'resource management'? How can this in turn illustrate contours of our relationships within the natural world? And how have we 'managed' the electromagnetosphere in Australia? What political, economic and cultural forces shape 'spectrum management' both historically and contemporaneously? This study seeks to reclaim ground for the common good, participatory democracy and citizenship, and an ecologically sustainable future. In this case we begin with a fundamental social and cultural institution of democracy - our communications system.

Today, the electromagnetic spectrum is the conduit that supports the leading communications technology of our times. Jeremy Rifkin affirms that 'the transition into a global information economy has increased the commercial value of the

electromagnetic spectrum' (1991, p.62). It is the medium of the information age and the global economy, but it is also a terrestrial medium (albeit a 'border' of extra-terrestrial space), as it lifts much of our communication out of the earthly bounds of pre-radio technologies into the 'wireless world' of the electromagnetosphere. As debate escalates in all corners of the world as how to best harness, or 'manage' our earthly 'resources', it is easy to misconceive and misunderstand the terrestrial medium (in the sky) which defines the electronic age we live in. The electromagnetic spectrum is more than 'something nobody can see, taste, smell or feel', and more than an 'invisible resource': it is also something dangerously underestimated and seriously lacking in critical contemplation.

The phenomenon of electromagnetism and the electromagnetosphere is something that is rarely given much thought outside of scientific circles. The interaction of earthly magnetism and electrical radiation underlies life in a complicated, life-sustaining model of symbiosis. Bioelectromagnetics researcher Roger Coghill has recently introduced a small but growing body of independent research which demonstrates that 'nature' uses 'similar methods for cell growth and regulation' (2001, p.29). New discoveries in this burgeoning field (stimulated by concerns with increasing exposure to electromagnetic fields, particularly mobile telephony) have demonstrated that:

> Our heart beats are mediated by electric fields, our energy in the form of adenosine triphosphate is synthesised using electric fields, and research shows that the body's endogenous electric fields are uniquely protective of the immune system's competence.
>
> (Coghill, 2001, p.29)

It is not only something that we therefore share with every culture, species and element of Earth: electromagnetism is central to the maintenance of life. This delicate, complex and largely invisible mutuality which binds earthly life to the electromagnetosphere may explain the neglect in concern. Just as only in recent decades have we begun to truly examine the welfare of other intrinsic life-supporting elements or 'resources', such as oceans, atmosphere, outer space, and even Antarctica, so too, must our attention turn to the electromagnetosphere. This context is important because, as naturally existing earthly phenomena, much of our oceans,

our atmosphere, outer space, and our electromagnetosphere belong to 'the global commons' or 'the international commons'. Threats to the welfare of these 'commons' must be interrogated and defused.

In the industrialised world, dependence on this conduit is obvious: spectrum is managed as a 'resource' by the nation-state so that civil society can utilise radio, television, cellular phones, PCs, palm pilots and pagers in which ever way they see fit. Clearly, advances in technology alter our relationship with this common conduit. Indeed, it is advances in telecommunications technology, beginning with the discoveries of Maxwell and Hertz, and the inventions of Marconi, Fessenden and De Forest, that forge the conversion of the electromagnetic spectrum (or the 'airwaves'), from a 'commons' to a 'resource'. In fact it could be argued that the discovery and utilisation of the radiofrequencies in the throes of the industrial and colonial worldview immediately confirms the transformation to 'resource'. Yet, cultural, political and economic pressures similarly hasten this conversion: the conversion does not take place in a vacuum. Like most technological developments, industrial, military and geopolitical forces, guided by the ideologies and energies of industrialism and colonialism, shape the relationship between culture and 'resource'. As the nation-state unifies these forces, facilitating technological uptake, so have they 'claimed jurisdictions upwards and outwards from traditional territorial boundaries' (Caldwell, 1990, p.257). This brings attention to some important assumptions of the industrialised world within its relationship to the natural world: notions of national territory, 'resource management' and property regimes.

1.1 Of Land, Sea and Skies: The Momentum of Enclosure

The rise of the European empires and the changing global power relations (or geopolitics) were a result of colonising the oceans; of securing trade routes, fishing grounds, and communication lines to colonies and trading partners. Deep historical roots can be unearthed as 'the commodification of the land commons was [only] made possible by the conquest of the oceans', a notion that, for Rifkin, can be traced back to the great navies of ancient times (1991, p. 53). Here the links between the military, industry and government and their concerted influence on ecological space begin to solidify and take form. The ascension of the nation-state, founded on

principles of territorialisation and claims of sovereignty over this territory, and administered by an apparatus of bureaucracy, industry and military, would culminate in a dramatic climax with the outbreak of World War 1. Like all modern wars of the last century, battle was waged over territory. Like all international conflicts, the war would stimulate technological developments and improved communications. At this hazy historical conjuncture we find both the invention of radio and the colonisation of the electromagnetosphere by governments via 'resource management'.

It was at the turn of the century with the invention of a 'flying machine' by the Wright brothers that political, commercial and military interests collectively arched their necks to the skies with an eye to mastering that space and appropriating it for the benefit of the nation-state. Rifkin (1991) incisively concludes that 'the enclosure of the terrestrial and oceanic commons established a historical precedent for the enclosure of the remaining ecological realms of the planet" (p. 58). As a result of oceanic colonisation, many regions of the world were now known, mapped and appropriated. The precedent was set and remains. The skies, however, were for untold ages the magical canopy high above civilisation. They were the canvas for cosmological motions and a blanket that nurtured and secured life. The new industrial world-view of the West would obliterate such pantheism. The accumulating drive for power, progress and technological advancement had released the flying machines and let loose atmospheric pollution, heralding the arrival of the humans in the heavens. A new frontier had opened.

The colonisation and appropriation of extra-terrestrial space heightened with the developments of the World War and the devastating role that the airborne military were to play, leading to nation-states claiming 'the right of total sovereignty over the airspace within their political boundaries' (Rifkin, 1991, p. 59-60). It was only a small step to extend this to the airwaves, which, with the inventions and refinements of Guglielmo Marconi, Reginald Fessenden and Lee De Forest in this first tumultuous chapter of the twentieth century, was soon accomplished. The refinement of radio broadcasting in these times of conflict and rebuilding would tap the magical qualities of our electromagnetosphere and forever change our communication with each other and with the state. It would also instigate intense interest from government, commercial, and military groups as the potential of this new

communication technology became astoundingly clear. Rod Giblett sees what followed as 'a typical act of co-operative resource exploitation of the eco-sphere' where extra-terrestrial space is 'enclosed by the private sphere of civil society (including corporations) and colonised by the public sphere (especially nation-states)' (2001, p.145).

This 'act of co-operative resource exploitation' begins with the colonisation of the electromagnetosphere by the public sphere: the nation-state. This is the conceptual leap that transforms a 'commons' to a 'resource'. It is extremely difficult to reverse once consummated in legislation. Enclosure of the electromagnetosphere, or 'privatisation', can only emerge from this initial process of colonisation. This co-operative procedure of colonisation and enclosure can be traced in the Marxist argument that the nation-state is indeed a bourgeois-capitalist state, with the former being merely an instrument and expression of the latter. The contemporary milieu is slightly different though, and as we will see, this mutual arrangement is the centrepiece of the modern, corporatist state.

Intrinsic to this new frontier of extra-terrestrial space, the electromagnetosphere - the first frontier of the electronic age - is opened for appropriation and exploitation. A process of exo-colonisation ensues, that is, an appropriation of space outside the boundaries of the nation-state, originating from the initial process of endo-colonisation. Toby Miller reminds us that:

> Governments sought from very early on, then, to exercise control over the airwaves as resources, initially for military purposes and thereafter to exercise the policing role of property protection, as well as a means to exacting revenue from users of the resource.
>
> (Miller, 1997, p. 48)

The ideological winds would continue to sweep clear a sense of imbeddedness in the natural world with the gradual shift to 'resource management'. For renowned ecologist Vandana Shiva (1992), 'industrialism' and 'colonialism' incurred a 'conceptual break' where 'natural resources' became 'inputs for industrial production and colonial trade' (p.206). Shiva traces the roots of the term 'resource' to early modern times, where it operated as a concept that 'highlights nature's power of

regeneration and calls attention to her prodigious creativity', and, more pertinently: 'implied an ancient idea about the relationship between humans and nature – that the earth bestows gifts upon humans who, in turn, are advised to show diligence in order not to suffocate her generosity' (p.206). For Shiva, in those early modern times, ''resource' therefore suggested reciprocity along with regeneration' (p.206).

The transformation of the electromagnetosphere to 'resource' occurs here in the aftermath of the first World War, where industrialism and colonialism dominate the ideological make-up of the Western political-economic-military system, and where they contribute greatly to this 'conceptual break' in the understanding and 'management' of 'natural resources'. The regenerative and creative qualities of the natural world are pressed to the margins and any understanding of reciprocity banished. 'Resources' transform simply into 'any material or conditions existing in nature which may be capable of economic exploitation' (cited in Shiva, 1992, p.206). Let us now ponder the unique nature of the electromagnetic resource before returning to how we in Australia have historically 'managed the resource'.

1.2 Portrait of a Resource: The Fifth Environment and the Fourth Front.

The electromagnetosphere shares similarities with other resources in some ways, but differs crucially in others. As a 'special aspect of the environment of radiant energy, including cosmic radiation', the electromagnetosphere 'surrounds the earth, permeates the atmosphere and is a phenomenon of the terrestrial planet itself' (Caldwell, 1990, p.272). Caldwell deems it 'the fifth environment', one which coexists with 'outer space, atmospheric, biospheric, and inorganic terrestrial environments' and which he correctly points out, 'although invisible to humans has a growing influence on their welfare' (1990, p.272). The electromagnetosphere crucially straddles the frontier of the terrestrial environment, bordering the highly contested, extra-terrestrial frontier of 'outer space'. In the latter half of this section I will discuss the military significance of the electromagnetosphere – 'the fourth front' of postmodern warfare (Giblett, 2001) – as military operations expand upwards and outwards, and how this may contribute to maintaining the current regulatory and propertied regime, particularly in times of uncertainty and threats to national security.

In conducting my research, brief explanations of unique characteristics are commonplace in most discussions of 'the fifth environment', but most lack the insight that can be found in Dallas Smythe's (1981) breakdown of the political economy of spectrum. Smythe, a former chief economist of the Federal Communications Commission (FCC, the U.S. equivalent of our own ACA), lists some key characteristics which I will summarise and use briefly as a platform for raising the questions and issues that frame this thesis. Firstly, Smythe posits the original and principal use of spectrum as 'the act of *sharing* information between transmitter and receiver, i.e., communication' [original emphasis] (1981, p.301). He continues: 'for no other resource is the principal function the transmission *and* retention of information or anything else' [original emphasis] (p.301). This raises questions central to this intervention I am undertaking. Why is this natural, communications 'resource' solely the narrow preserve of economists, lawyers and government policy-makers? Why are the 'property regimes' that govern the management of this 'resource' not debated within the field of cultural, communication and media studies, when clearly the status of the communications channels in weaving the cultural fabric of Australia is at stake? These questions spur this research and nourish this alternative analysis of 'spectrum management'.

What truly differentiates the electromagnetic spectrum from other natural resources is its 'nondepletable and self-renewing' nature (Smythe, 1981, p.301). While we struggle to grasp the finite limits of our natural resources worldwide, here we find arguably our most vital cultural resource to be one that cannot be over-used and exploited into extinction. Although the spectre of hazardous electromagnetic radiation looms large in today's world (see, most recently, Carlo and Schram, 2001), would the real crime (or tragedy) lie in the underutilisation of the electromagnetosphere? Caldwell insists that 'human control over natural electromagnetic phenomena is, however, very limited; use of its various aspects is strictly on nature's terms', citing geo-magnetic storms as an example of this tentative control of the resource (1990, p.272). Would wider contemplation of the 'nature' of the electromagnetic 'resource' assist in humbling the vagaries of human control, management and mastery? Could this bountiful but untamed 'resource' help to

reinstate Vandana Shiva's reading of the early concept of 'resource', notably around notions of respect and reciprocity?

A further platform for reclaiming the airwaves from the narrow anthropocentrism of economists, 'new economy' corporatists, military and government, rests on Smythe's claim that 'the radio spectrum is the first form of world property' (1981, p.302). Smythe cites 'worldwide cooperation' and the regulatory role of the International Telecommunications Union (ITU) as 'necessary for the radio spectrum to be used by everyone' (p.301). He continues:

> Because the radio spectrum is used to transmit information, and because control of the flow of information is the basis of political power, the control of the use of the radio spectrum lies close to the seat of sovereignty in the building-blocks by which the world community is presently structured: nation-states. No other resource has this order of political, tactical, and strategic significance. Whenever a coup or revolution occurs, control of the radio capability is an essential measure because through it even the military is directed. At the same time the necessary joint decision making by all nations at the world level contributes to the practice of world sovereignty.
>
> (Smythe, 1981, p.301)

For Smythe, this places the electromagnetic spectrum 'partly in the category of common property on a world scale, and partly in that of state property' (1981, p.301-2). Concordantly, the areas of the electromagnetosphere that lie outside of national jurisdictions are 'international commons' of the sort Caldwell describes (1990, p.257-8). These complex and overlapping property regimes intrinsic to the electromagnetosphere stimulate this study. Clearly, industrial and colonial concepts of territory, property rights and 'resource management' become convoluted in the electromagnetic environment. This discordance draws attention to the sensitive nature of the electromagnetosphere, particularly in the realm of geopolitics and national security. And it is particularly in these interests that the incumbent regulatory regime will seek to maintain the contemporary status quo in regards to 'spectrum management'.

It would be valuable to briefly interrogate this relationship between the military operations of Western, industrialised nation-states (particularly the U.S.) and the electromagnetosphere, mainly because the development of wireless communications technologies often have origins within military research institutions. Moreover, the militarisation and weaponisation of 'outer space' is one of the most pressing concerns of the 'new' globalised world (see Grossman, 2001). Drawing from the work of Paul Virilio and writing in the context of postmodern warfare, Rod Giblett (2001) has claimed the electromagnetosphere as 'the fourth front after land, air, and sea' categorising 'orbital extra-terrestrial space' as 'the fifth front with mastery over the first three using the resources of the fourth front' (p.142). The crucial role of wireless communications - 'the fourth front' - in contemporary warfare further illustrates the growing importance (and growing complexity) of the airwaves to contemporary life and international security. Giblett analyses this with conviction, demonstrating the colonising force of the United States (politically, militarily, and later, economically) from Cold War to the Gulf War, as a powerful threat to the 'commons' of both electromagnetic and extra-terrestrial space. He concludes with a convincing call to action:

> We need to decolonise and republicise the enclosed and privatised global commons of the electromagnetosphere and orbital extra-terrestrial space in order to try to create equitable access to communication and their technologies in the earthly household sphere, the ecosphere.
>
> (Giblett, 2001, p.147-148)

Smythe (1981) similarly sees the need to 'eliminate the military and communications aggressions which now continue to violate the rights of [particularly 'Third World'] people to determine their own future' (p.317). The ramifications of militaristic, Western conceptions of how the 'resource' should be managed are indeed global, and in times of international conflict and uncertainty will be strengthened. Clearly, the electromagnetic 'resource' requires a broad and engaged scope of international cooperation and dialogue due to its highly sensitive relationship to nation-state sovereignty, but industrial, and particularly American conceptions, as a result of their political, militaristic, economic and technological

superiority, dominate the management of this common, global communications conduit.

The importance of the electromagnetosphere to the nation-state and international politics in today's 'inevitable' march towards the globalised information economy is obvious. In the latter half of this section, the greater complexities involved have been acknowledged and unravelled. As I have indicated, the impending questions arise from the agenda-setting role of the industrialised world, which, although comprise a minority, are stamping, and, via international free-trade agreements and global economic institutions such the World Bank, the International Monetary Fund (IMF) and the World Trade Organisation (WTO), not to mention their own technological and economic superiority, *enforcing* an international model for the management of the electromagnetosphere. This international context, although complicated and largely beyond the scope of this study, cannot be overlooked, particularly when the military prerogative is mobilised to maintain the current path of 'spectrum management'. This relationship would indicate the need for further research in this context. However this analysis must reorientate, as I am more interested in the national level of 'spectrum management' in Australia, and, central to that deliberation, the role, or the absence of a role, for local regions and communities. Let us now return to the Australian rear-view mirror – where political and economic forces take centre stage - to round off this backdrop to the research.

1.3 An Overview of the Rear-view: Political Economy, Media Corporations, and the Spectrum Police.

Let us firstly position the discussion of 'spectrum management' in context by outlining the contours of our contemporary communications environment: our 'mediasphere', and, increasingly, our expanding 'telecosm – the universe of communications and computers' (Huber, 1997, p.4). This depends largely on understanding the many paths we have chosen to follow in recent times and the awareness of the dilemmas they may unwittingly lead us into. It would be wise to recall that the future is not a technologically determined one: it is still 'unclear what the eventual mix will be between satellite, cable and terrestrial digital broadcasters' (Herman & McChesney, 1997, p. 47). These paths that shape our 'mediasphere' and

'telecosm' are relatively undeveloped, but we can identify political, economic and cultural trails that direct us towards a particular communications environment. Although it may be advantageous, there is little room here to trace these trails too far back, so I will reflect on the maze that constitutes the 1990s, as this decade produced conditions conducive to the growth of the 'auctions regime' which I will analyse in the following section. In the pursuit of a wider, more illustrative context, a brief, and sketchy, historical overview of 'spectrum management' in Australia will run through these initial deliberations.

From its early, and legally tumultuous beginnings, the radiofrequencies fell under what Daniel Bromley would classify as a 'state property regime' where '[I]ndividuals and groups may be able to make use of the natural resources, but only at the forbearance of the state' (1991, p.23). This administrative licensing regime - the 'administrative paradigm' as Eli Noam calls it (1998, p.766) - dominated the regulation of the radiofrequencies from its beginnings in the 1930s right up until the early 1990s. This was instituted primarily on the basis of scarcity – that the electromagnetosphere is a limited resource – a basis that is eroding with new developments in communications technologies (this will be discussed at length in a later section). Suffice to say, the rhetoric of 'resource management' – centralised state control, regulation and 'policing', 'property-mimicking' access and allocation regimes, and the invocation of 'natural scarcity' – has profoundly shaped the management of the 'airwaves'. Yet this rhetoric is couched within political discourses of 'neoliberalism', economic discourses of 'efficiency' and 'deregulation', and an overarching culture of anthropocentrism. These are clearly 'unsustainable' – in the ecological sense of the term, not the economic – but for now dominate the immediate future of 'spectrum management'. Is it possible to wrestle 'the invisible resource' away from this rhetoric and pose more penetrating questions and even sustainable modes of 'spectrum management'? Can we forge steps towards thinking 'outside the "resource management" box' as Yochai Benkler (1998, p.294) has asked?

Celebrated media and communications scholar Trevor Barr (2000) has succinctly uncovered these early paths in 'spectrum management', subsequently demonstrating that the licensing regime contributed greatly to the high concentration of media

ownership inherent to today's contemporary Australian mediasphere. He reminds us that '[w]hen radio licenses became available in the 1920s and 1930s, it was largely the successful newspaper company quartet of Murdoch, Packer, Fairfax and the Herald and Weekly Times group that acquired them' (2000, p.3). Although this 'privileged access was granted to public assets ... licenses were intended to carry with them reciprocal obligations' (p.5). Yet Barr continues his incisive opening chapter by tracing the 'blatant partisan favouritism' of federal governments towards the broadcasting companies from the 1930s through to the 1990s (p.5, p.10-16), while also noting the changing face of the federal broadcasting authority – one half of the Australian 'spectrum police' - from the Australian Broadcasting Control Board (1949 – 1976), to the Australian Broadcasting Tribunal (1976 – 1992), to the 'less overtly regulatory' Australian Broadcasting Authority, since 1992 (p.5). For Barr then, '[b]roadcasting policy has been one of the most blatantly politicised and incompetently managed areas of government policy since Federation' - a seething condemnation if ever there was one (p. 10).

The 1990s were therefore a period where economic notions of efficiency and competition were the 'centrepiece' of public policy (Barr, 2000, p. 210). This narrow economic approach to policy has left us with a peculiar media and communications environment, particularly in relation to international comparisons. It is peculiar in the sense that we now straddle a period between an existing analogue system of broadcasting and the inevitable digital future that awaits us. This digital future promises much for Australian media and culture, yet the incumbent Coalition government has far from embraced it. For example, as we will soon see in detail, with the allocation of spectrum for broadcasting, a form of protectionism operates enclosing the dominant existing media broadcasters in relative security to at least 2005. The prospects of digitisation throw this form of protection into disarray as the entrenched basis for spectrum regulation – that of scarcity – dissolves with digital compression technologies.

The communications sector in Australia is highly regulated. The Productivity Commission initiated an inquiry last year to address the complicated future of media regulation in Australia. Although a lengthy, multifaceted and detailed report, the Commission sees 'digital broadcasting as Australia's best chance for a more diverse

and competitive broadcasting system' (Thomas, 2000, p. 10). For Thomas, the inquiry has produced a 'double argument': 'that regulatory obstacles to new media may handicap their growth for many years; and that the existing framework of media law and policy needs to be redesigned for life after analogue' (p.11). The Commission seeks greater efficiency at one level, yet it also draws attention to spectrum as a valuable public resource, giving credence to the idea of an electromagnetic 'commons'. This research is in part an attempt to intervene in the context of a social and cultural policy framework that recognises the common ownership of spectrum by the public. An examination of spectrum allocation and management in Australian – and later, the challenges both technological and cultural - will bring this lack of cultural discourse on the electromagnetosphere to the fore. For now, let us include the role of the media and telecommunications corporations – especially the broadcasters - in the Australian mediasphere and its emergent telecosm.

The media and telecommunications sector are the central plank of the 'new' Australian economy contributing greatly to government revenue since the early 1990s: media corporations via broadcasting licenses and telecommunications companies via spectrum auctions. In a nation which subscribes whole-heartedly to the myth of economic and technological growth equalling greater social equity (colloquially known to economists as the trickle-down theory), it would seem that attention must turn away (but not completely) from the content as such, and to a more involved analysis of the very channels of communication: the electromagnetic spectrum itself. A shift in thinking about our media and culture is necessary. If coming to grips with the new relationship between commerce and cultural content has proven contentious, how will this relationship change if we relinquish control of the very channels that facilitate this content? As Jeremy Rifkin has so eloquently stated recently:

> If the flow of human communications is controlled by global media companies, how do we ensure that social and cultural points of view and political expressions that may differ from those of the companies who own the frequencies will be allowed to flow over the spectrum?
>
> (Rifkin, 2001, p.2)

In Australia our commercial landscape is peppered with the operations and strategic alliances of transnational corporations, mainly because a subscription to economic and technological growth implicitly includes a subscription to 'free trade' and 'the global economy'. An entrenched oligopoly of broadcasting media corporations dominate the Australian mediasphere, subsequently occupying a privileged position to similarly dominate the emerging telecosm, and exploit the electromagnetosphere commercially. Nationally, the two arms of the 'spectrum police', the ABA and the ACA increasingly seek efficiency, competition and industry self-regulation, illuminating the dominant economic imperative that underpins the 'resource management' approach. As American cultural critic Ivan Illich stated at the dawn of the computerised information age, '[b]y definition resources call for defense by police. Once they are defended, their recovery as commons becomes increasingly difficult' (1983, p.9). The rhetoric of 'policing resources' extends much further today though as global economic institutions like the World Bank, the IMF and, more recently, the WTO, survey and police international markets, and foster international economic agreements, including the market in 'spectrum'.

For Rifkin, the international telecommunications accord of 1997 was a manifestation of the new global corporate influence which removed 'one of the most basic regulatory powers' of national government: 'the right to determine the terms and conditions on how communications are structured and accessed within their borders' (2000, p.225). The 'international police' now over-ride the nation-state. It may be worth recounting David Suzuki and Holly Dressel's reminder that:

> the force driving this takeover of the world is not military might, as it was for the great political empires of the past. Today power is no longer the exclusive prerogative of the nation-state. Now it is increasingly exercised by private corporations; and the change has been revolutionary.
>
> (Suzuki and Dressel, 1999, p.187).

Power is now dispersed across national borders, with global media and telecommunication corporations vying for control and influence within these new power configurations. The 'resource police', increasingly pressured by the growth of

the corporatised world-view, work instead to safeguard the incumbent media and telecommunications powers. This pressure is political, economic and global. Herbert Schiller perceives a new media order of 'transnational corporate cultural domination' where 'private giant economic enterprises pursue – sometimes competitively, sometimes co-operatively – historical capitalist objectives of profit making and capital accumulation, in continuously changing market and geopolitical conditions' (cited in Morley and Robins, 1995, p. 13). Herman and McChesney take this a step further with their conclusions: 'it was no longer appropriate to speak of American cultural imperialism, as much as one should speak of transnational corporate cultural imperialism with a heavy American accent' (1997, p. 40). Again the historical imperative of the capitalist, industrialised economic system is emphasised: deep historical processes have moulded the imbroglio we find today.

Yet the traditional Marxist analysis of the bourgeois-capitalist state has been superseded - the spectre of the modern corporatist state now haunts the labyrinth of contemporary culture. I have alluded to this earlier in teasing out the roles of the nation-state and the private sector in colonising and enclosing 'commons' respectively. As we will soon see, the nation-state strives to accommodate the corporate sector in their management of spectrum, demonstrating a new mutualism of interests, even when this runs against the very economic principles they claim to stand for and the democratic interests they claim to represent.

Corporate media influence is real and in the Australian context of 'spectrum policing' (or regulation), safeguarded until at least 2005. David Morley and Kevin Robins astutely summarise this 'restructuring of the global media':

> We are seeing the restructuring of information and image spaces and the production of a new communications geography, characterised by global networks and an international space of information flows; by an increasing crisis of the national sphere; and by new forms of regional and local activity. Our sense of space and place are all being significantly reconfigured.
>
> (Morley and Robins, 1995, p.1)

As our senses of place – and importantly our sense of ecological place - are 'reconfigured', new communication strategies and concepts must be mobilised as a

precautionary measure against complete commercialisation by media and telecommunications corporations. The urgency of this counter-argument to complete commercialisation (or privatisation of the 'spectrum') should gain currency as this research unfolds. There is clearly a need to tap into the 'new forms of regional and local activity' through greater encouragement of localised technological development and access to production, networks and, most pertinently, the very channels themselves.

The provision of the electromagnetic conduit for government institutions such as universities, schools, libraries, museums and environment centres, must be mirrored in a similar provision for the diverse collection of organisations that are non-governmental and (generally speaking) non-profit: charity groups, various activist groups, environmental, health and youth organisations. It is particularly this latter group which work with and seek to reclaim 'the commons' in its various forms at a localised and regional level, and as such, their commitment to 'the commons' - the common good and the common wealth - must be nurtured and granted space to flourish. These provisions, or allocations, would seem an ideal initiative for complementing an overly commercialised mediasphere.

For now though, this shift looks increasingly difficult, as the absence of political and economic support indicates. However there are already some early examples of localised wireless networks in Australia, particularly in government institutions such as schools (Spencer, 2001, p.37), which are tentatively clearing the way towards an 'electromagnetic commons'. As we will see, the shift into, and the solidification of, what Noam calls the 'auctions paradigm' brings with it major social and cultural challenges (1998, p.768). What are the social and cultural implications of continuing this path towards an information society where the electromagnetosphere is completely centralised and partly privatised?

We are witnessing a triumph of 'economic rationalism' with the rendering of technological developments in communications to accommodate a centralised and commercialised wireless telecosm and the creation of a cultural hierarchy with corporate and government interests seated comfortably at the top and the interests of our communities and ecologies clinging to the bottom rung. This is unfortunately the

reality of the corporatist state. This 'triumph' of the economic rationalist agenda is most blatantly crystallised in the orthodoxy of the 'spectrum auctions' to which we will now turn the focus of this study.

Chapter Two. Auctioning Our Airwaves: The New Orthodoxy

In looking at recent developments what we are witnessing is a shift from a state property regime – the 'property-mimicking' of administrative licensing - to the early forms of a private property regime where auctions grant domain over, or lease, 'slices' or small parcels of 'spectrum' for a specified period of time. Although the economic argument affirms the 'efficiency' of auctions as a means of allocation and exacting revenue, invoking a sense of 'inevitability' prevalent in contemporary economic discourse, what we will see in this analysis of the 'auctions paradigm' is that the two subscribe to a similar set of assumptions and ideological underpinnings that dominate the industrialised approach to 'resource management'.

What stimulates this discussion here are two concerns. Are these initial steps towards the privatisation of 'spectrum' likely to lead to an all-encompassing private property regime? Does this cloak the possibility of alternative regimes? As we shift into a digitalised mediasphere and telecosm it becomes crucial to debate these 'discourses of inevitability'. What we are tracing here then is the alignment of the 'auctions orthodoxy' with the dominant political and economic discourses of 'resource management', what may be termed as economic determinism. Within Australia I will analysis the machinations and ramifications of the new orthodoxy beginning with the Federal Treasury's predictions of high auctions revenue in early 2000 to the infamous collapse of the 'datacasting' auctions in May 2001. Adding depth to this constellation of criticism is the work of American scholars Jeremy Rifkin, Yochai Benkler and (particularly) Eli Noam who have each weighed into the debate with their own unique critical insights. We also introduce the commentary of Australian communications writer Stewart Fist, a long time observer and critic of the new orthodoxy in Australian 'spectrum management'. What follows is a detailed critique of the 'auctions paradigm' within recent Australian developments, an exercise which will furnish the foundation for the technological, political and cultural arguments for an alternative regime that will be addressed in the following sections.

The origins of the auctions regime has been traced to the interventions of economists in American spectrum management with Ronald Coase (1959) and Harvey Levin (1971) providing the most convincing intellectual arguments for

auctioning spectrum space to the highest bidder (Noam, 1998, p.768). Their critique was directed at the 'inefficiency' of the administrative licensing regime, and concluded that a shift towards a private property regime, initially through auctions, was the better alternative. Although there was an initial resistance to their arguments, notably from established broadcasters, 'It was then only a matter of time before the need of the state for more revenue overpowered its propensity to manage societal resource allocations administratively' (Noam, 1998, p.768). The claims of 'greater economic efficiency' - a growing mantra for government - provided 'the good-government cover for the change' as Noam puts it (1998, p.768). At the beginning of the 1990s then, the auctions regime – the first steps towards the privatisation of the airwaves – was the only alternative regime for spectrum management, and came with complete support from the powerful discourse of economists.

In recent years the auctions regime has become the new orthodoxy of spectrum management. Yet, as with any established orthodoxy, questions arise when the regime becomes complacent and cracks in the system begin to show and this is now evident in the growing criticism of the auctions regime (Noam, 1998, Benkler, 1998, Rifkin, 2000, 2001). The central fault-line that runs through this regime is the inherent complacency that exists in flat defiance of the turbulent external conditions that demand fluid and healthy alternatives to be kept at arms length during times of continuing technological and cultural change. These two aspects will be discussed at length in the next section. For now, an overview of the auctions implementation in Australia since early 2000 will reveal some of the faults in the regime and the costs borne by the public. I will also interrogate the basis of the auctions regime which rests on similar assumptions and ideological positions as the administrative licensing regime, namely that of what Noam calls 'licensed exclusivity' (1998, p.769).

2.1 The Australian Experience: A Case Study of the 2000/01 Financial Year

This recount of the recent auctions in Australia work to provide an example of how the auctions regime is beginning to crack and fissure. I will provide an overview of this time-line from early 2000 to mid 2001 and indicate the major players, the beneficiaries and the losers of this most recent auctions process. The two auctions that dominated this time-line, the 3G auctions and the datacasting auctions, attracted

much publicity and, especially in the case of the latter, some much needed controversy and debate. In the section that follows this overview of the most recent Australian experience with the auctions regime, I will use the work of Eli Noam to elucidate the Australian example and strengthen the critique against the auctions regime.

In May 2000 the Federal Treasury and Treasurer Peter Costello were anticipating huge windfalls for the upcoming spectrum auctions (Elliot, 2000, p.21). The high consumer uptake of mobile telephony and the potential of future applications of that technology, particularly mobile Internet applications, fuelled this anticipation. Auctions in other parts of the industrialised world have realised similar windfalls. At this point in time, close to $2 billion had been raised in the preceding years as attention now shifted to the much vaunted 3G (Third Generation) and datacasting auctions of 2001. The Howard Government forecast $2.6 billion in revenue from the 3G auctions for the 2000-01 Budget 'bestowing a unique right on telecommunications to use the airwaves, or spectrum, to build and operate for 15 years' (Elliot, 2000, p.21). Australia's largest mobile phone and telephony spectrum 'owner', Telstra, was joined by AAPT Spectrum, CKW Wireless, Hutchinson Telecommunications Australia, Qualcomm, Optus Mobile, and Vodaphone Pacific as the potential bidders for the auctions (Spencer, 2001, p.29). Interestingly, the ethical questions that surface from collecting revenue from potentially hazardous technological applications were not raised during this period of high anticipation.

In late March 2001 the 3G auctions ground to a halt after five days of bidding. The results demonstrated the small but powerful group of beneficiaries of the auction process, but more importantly illustrated the flaws in the regime. Telstra, Optus and Vodaphone were the big winners having 'purchased enough spectrum to set up individual national networks' to supply the 3G phone services (Mitchell, 2001, p.34). The losers were both the Government and the Australian public. On the eve of the auctions AAPT (a Telecom New Zealand subsidiary) pulled out of the auction prompting analysts to warn the Australian Government that they had 'little hope of making the $2.6 billion' (Hughes & Smith, 2001, p.59). In the end $1.17 billion was raised, well below the forecasted revenue and only marginally above the set reserve price. An international downturn in auctions revenue had prepared the more

experienced commentators for the impending 'flop', illustrating the vagaries of market-based decision making in managing important cultural resources. At the same time, tension was mounting between the government and potential bidders for the datacasting auctions, to which we will now turn.

In the same issue of the Weekend Australian that Geoff Elliot's article on the Howard Government's hope of a 3G auctions 'windfall', a more penetrating article by Michelle Gilchrist appeared, examining the early plans for that unique Australian invention: datacasting. Gilchrist posed an important opening question in her article: 'What distinction exists between phone and TV spectrums that one should be sold to the highest bidder but the other reserved and protected for existing players?' (2000, p.29). Now although I will discuss the *similarities* between the two regimes (one for telephony and one for television) shortly, at this point the argument was focused on the rules being drawn up around what datacasting actually involved, and particularly the political prerogatives of the decisions made. The restrictions on potential datacasters basically prohibited the transmission across the airwaves of anything that even slightly resembled television content in the digital format. In other words, datacasting must not compete with the existing free-to-air television. The Government's case rested on the claim that the incumbent broadcasting companies were 'making an investment of nearly $1 billion in digital TV equipment and [that they] deserve some recompense in the form of reserved parking on the digital spectrum and no new competition' (Gilchrist, 2000, p.29). Gilchrist posits a more convincing reason: 'Telco companies do not own one of the government's favoured means of communicating with voters' (p.29).

Here we are again reminded of Trevor Barr's criticism of the Australian broadcasting regime: the blatant politicisation of spectrum management. The Howard Government, much like previous governments, had intervened for essentially political reasons. Barr (2000) has noted a 'shift in the prime role of regulation from notions of serving the 'public interest' to monitoring 'structural regulation' – the purpose of which is to facilitate unfettered market-based decision-making' (p. 212). It is here that we can view the partial shift in spectrum regulation to this form of 'structural regulation': it applies to telecommunication companies but not the broadcasters. The conditions placed upon potential datacasters indicate an implicit

form of protectionism that constrains market-based decision-making and runs against the prevailing ideologies of the Howard government. And the 'public interest' is still a requirement (although a vague one) in allocating licenses to broadcast. This is an interesting situation as the two forces of protectionism and public interest sit uneasily together: they undermine the ideological position of the economic rationalists. Do the two regimes – administrative licensing and auctions – have more in common than some commentators have realised?

Now surely it is in the public interest to free Australian citizens and audiences from the oligopoly of the Australian media corporations? Stuart Cunningham and Angela Romano (2000) have expressed similar concerns at the political influence the corporate media wield in the changing Australian mediasphere, and the threat it poses to independent reporting and coverage. It would indeed seem that the floodgate of digitisation, multi-channelling and new competition may potentially wither the media corporations influence and power. But should we be more concerned with the general shift, which both regimes embody, towards a completely commercialised and enclosed electromagnetosphere?

Our current system deals with existing broadcasters differently from other commercial users of spectrum. Julian Thomas reminds us that 'broadcasters are allocated spectrum without charge within the broadcasting services bands by the Australian Broadcasting Authority (ABA)' while other commercial users must purchase spectrum at auctions orchestrated by the Australian Communications Authority (ACA) (2000, p. 11). As the constraints of spectrum 'scarcity' unhinge with new digital technologies, Australia's broadcasting corporations increasingly appear to wield substantial and dangerously influential power over media and communications policy specifically, and our political landscape in general. The regulatory regime polices the electromagnetosphere through the datacasting restrictions and a licensing system favourable to the existing broadcasters, illustrating the influence of the Australian corporate media oligopoly quite clearly.

On Thursday May 10th the news that the datacasting auction had been cancelled made the front page of The Australian (Gilchrist and Marris, 2001). News Limited, publisher of the national newspaper, was an avid critic of the restrictions placed on

datacasting, and along with fellow critics Telstra, John Fairfax and the Australian Consumers Association, sought to challenge the oligopoly of the free-to-air broadcasters. The winners were clearly the incumbent broadcasters, while again both the government and the Australian public were the losers. By the end of the month the Federal Government's Budget did not 'include plans to recoup money from the cancelled data auction' (Mackenzie, 2001, p.35). The government's anticipated auctions windfall, so promising in early 2000, had all but crumbled by the end of the 2000/01 financial year, leaving behind the remains which I have unearthed and will examine at greater length in the following section. From the initial forecast of at least $2.6 billion from the auctions, the government collected $1.3 billion, and at the same time demonstrated the problems with the regime at a number of levels. Let us now turn to the remains of the auction 'flops', and with the assistance of Eli Noam's critique, examine these imperfections and in the process build a strong case against the future of 'selling off spectrum'.

2.2 The Complacent Regime: Sloppy Economics, Corporate Crops, and the Auctions Flops.

What is clear about this brief period where the auctions orthodoxy reached its pinnacle of complacency – in the 2000/01 Australian financial year - is the increasing shift towards the basis for a private property regime, the important role the auctions play in the federal budget, and the trend towards greater encouragement of media and telecommunications oligopolies. Let us first discuss the drive to enclose and privatise. The question is simple, as Noam has pointed out: 'is the spectrum the government's to sell in the first place?' (1998, p.771). Rifkin reminds us that 'in reality, the spectrum is treated as a commons ... the electromagnetic system is owned by the government on behalf of the people' (2001, p.1). So what has legitimised this move towards auctioning spectrum, and potentially allowing media and telecommunications companies to 'trade them back and forth as 'private electronic real estate'' (Rifkin, 2001, p.1)? The answer lies here in Rifkin's use of the term 'real estate'. The electromagnetic spectrum is managed as solid space, as landed property. As Noam has stated 'many economists and policy advocates have been prisoners to the analogy of spectrum to land. But spectrum access is traffic control, not real estate development. It is about flows not stocks' (1998, p.770). This ties back into the

misconceptions and rhetoric of 'resource management' where the drive to privatise is increasingly seen as the most efficient means of managing resources. Yet as I have made clear in preceding sections, the electromagnetosphere is a unique cultural 'resource' which defies many of the structures that 'resource management' places upon it.

The misunderstandings arise from the misconception of the electromagnetosphere. It is simply not being managed as the most important cultural conduit of communications in the globalised information age. Rather, 'spectrum' is hoarded and only privileged groups may utilise this conduit. Centralising power in the hands of media and telecommunications companies is an obvious violation of our rights to independent and localised information. This has lead to some American scholars to claim the spectrum auctions as 'no longer constitutional' (Benkler and Lessig, 1998, p.12). Although we lack the constitutional rights to free speech in Australia, the ramifications should be obvious to those who value freedom and democratic decision-making. Rifkin's concerns are that once this first 'partial privatisation plan' is instituted 'the commercial foundation would be laid for a final conversion from government licensing of the spectrum to a future sell-off to the private sector' where 'international trade sanctions could be imposed' (2001, p.2). Although this is unlikely, it does illustrate the potential long-term effects of a determined push towards the privatisation of the airwaves. And if this push originates from our government or the corporate sector, then we should be wary of their levels of determination.

The two regimes that underlie spectrum management in Australia – one for broadcasters, the other for telecommunications (and future digital applications) – spring from similar political and economic positions. They are each based on what Noam calls 'licensed exclusivity' (1998, p. 769). They are both regimes that *prohibit* transmission across the airwaves, unless you have a license or are a spectrum "owner". In the current climate, I would be severely penalised if I were to broadcast across the radiofrequencies (although there is allocation for amateur CB radio). Benkler puts it thus:

> "Spectrum allocation," whether it be done by licensing or auctioning, is the practice whereby government solves this coordination problem by prohibiting most people in society from operating radio transmitters, and threatening that it will tear down their antennas and confiscate their transmitters if they try to communicate with each other using wireless communications equipment without permission. This is done so that other people – broadcast licensees or spectrum "owners" – can successfully communicate.
>
> (Benkler, 1998, p. 291)

For Noam then, 'exclusive use' is the 'technological and economic foundation of both the administrative and auction paradigms': an implication of the private property undercurrents that run through 'resource management' (1998, p.768-9). This is the impending 'enclosure' of the electromagnetic commons unfolding before us, and with it an imminent upheaval in our 'invisible' relationship with the electromagnetic conduit. The momentum of enclosure is identifiable in this shift in spectrum management: the replacement of customary rights to a commons (albeit a 'commons' which our government has managed on our behalf), with the exclusive regime of private property. Vandana Shiva has reminded us that 'the Latin root of the word 'private', interestingly enough, means 'to deprive' (1992, p.211). So what would we be deprived of in a world where the electromagnetosphere is privatised? Universal access and public accountability? Alternative cultures and ideas? Space for non-commercial activities? Dissent and debate? It is difficult to grasp the full ramifications of the 'push' to privatise the airwaves, but in a sense they are widely understood – common sense tells us that the privatised world brings with it an infringement on basic rights and freedoms.

The other side of the deregulatory push towards privatising our common, national 'assets' is the revenue windfalls that nation-states are likely to collect. This is entwined with the ideological shift in 'resource management' towards market-based decision making. Is the trade off likely to benefit local communities and our ecologies? Whose interests are at the forefront of the decisions being made? What are the consequences of selling spectrum to 'the highest bidder'? The most concrete exemplification of this structural change towards market-based management is the replacement of the Spectrum Management Agency with the Spectrum Marketing Group, who now coordinate the auctions. Eli Noam sees the 'underlying' objective'

of the auctions as being 'to raise revenues for government ... as a measure to reduce the budget deficit and to avoid spending cuts and tax increases' (1998, p.772). The regulatory framework of the auctions regime is therefore one '[c]onceived in the original sin of budget politics rather than communications policy ... doomed to serve as collection tools first and allocation mechanism second' (Noam, 1998, p.773).

A particular assumption that drives both sides of the political spectrum is that a budget surplus somehow equates with responsible government. A sound communications policy, particularly its social and cultural elements, is marginalised in this movement to market-based models for resource management. This marketing of spectrum is lauded as economically 'efficient' and the evidence is in the accounts. But what is 'efficiency'? Is it not quick, short-term, market-based solutions that provide immediate and maximum economic benefits, such as a budget surplus? Is this the auctions process in a nutshell?

The prioritising of the short-term over the long-term, an outlook that is inherently unecological, and, therefore arguably uneconomical, dominates the conceptual shift in resource management. Subsequently, the shift appeases both 'neo-liberals' (who want to see more money in the government purse) and 'neo-conservatives' (who wish to see less government influence in contemporary life) as James Boyle (2001) has similarly noted. This dual appeasement hinders the wider debate and cloaks the possibilities of alternative regimes and models for resource management.

Analysing the evidence in the remains of the failed auctions of the Australian 2000-01 financial year illustrates the importance of budget politics over and above communications policy. The 3G auctions went ahead with only six bidders. Two of the bidders, Telstra and Optus, already share a strong foothold in the emerging telecosm. For the Federal Treasury the auctions had become the means of securing the revenue for improving, for example, access to services and bandwidth in rural and regional areas. This same principle had applied to the further (and complete) privatisation of Telstra. An intriguing paradox was presented: the government's economic responsibility for access to improved telecommunications for its citizenry rested on the government increasingly opting out of the economic responsibility for the carriers themselves. This is indicative of the ideological shift in Australian

politics: meeting the social and cultural responsibilities of a communications policy involves a trade-off that will inevitably have long-term negative social and cultural effects. Many will claim this as an 'inevitability' or a worthwhile 'trade-off'. Some might say it is an exemplary account of 'privatising the profits, socialising the losses'. Without a doubt, the democratic basis of a national communications system is under threat.

With the datacasting auctions - the other side of the coin where the auctions regime clashes with the licensing regime - the tangle the government is now in becomes apparent. With these auctions another trade-off surfaces. The government misses out on revenue but secures favour with the incumbent broadcasters. The decision is rationalised on essentially a political argument: don't upset the broadcasting oligopoly and they won't upset you. The trade-off will have major repercussions. At the social and cultural level we can expect to see complacent and apolitical treatment of election issues on free-to-air television. Moreover, it is an attack on democracy that in turn reveals the contradictions in the government's position, and the growing reality of the corporatist state.

In the digital technologies sector many attacked the failure of the auctions claiming the cancellation of the auctions 'set back competition in the industry and increased confusion for consumers' (Spencer, 2001, p.31). The technological implications of the government trading off revenue for relative political neutrality in television broadcasting in an election year will be profound. Not only will there be more reliance on overseas research and technology, these applications will be shaped by the current media and telecommunications climate: a centralised wireless communications system where the conduit (the electromagnetosphere) is slipping from public hands into private ones.

Possibly the most insidious threat to the welfare of our electromagnetosphere are the very agents who pressure the move to a privatised regime. Their benefits are tantalising: through deregulation and competition, economic efficiency results, leading to greater consumer benefits and choice and more revenue and less responsibility for the nation-state. These agents are the media and telecommunications corporations, which increasingly can be seen as converging into

one and the same body. The corporatist framework is a complex one: it is a double-edged sword. The framework facilitates competition but increasingly, co-operation. Multi-lateral working agreements between these companies abound, and subsidiaries and joint-stock companies give the impression of fragmented influence and power. But the reality is that they share a common aim: profit.

Does the auctions regime work more for competition or cooperation between these corporations of the new economy? Stewart Fist has been an avid critic of Australian spectrum management throughout the last decade or so. His claim that 'Australia has more radio and television spectrum than it knows what to do with' and that our governments continue to deny this aspect, is a fitting one in this context (2000, p.1). Fist provides a straightforward critique of the tendency in auctions to concentrate power (and spectrum) in the hands of a few:

> They [the government] love to hold auctions where past and future carriers and broadcasters can be set against each other in a competitive battle to pay the highest prices to monopolise a highly-desirable chunk of bandwidth. To make sure that only the richest corporations win, spectrum is licensed and then parcelled out in tiny batches.
>
> (Fist, 2000, p.1)

Let us now take this a step further with the more sophisticated economic arguments of Eli Noam. Firstly, the auctions process demands high payments (for 'tiny batches' of spectrum) in advance. This operates as a 'barrier to entry' and has the potential to 'reduce the pool of entrants' (1998, p.775). For Noam then: 'the highest bidders will be those who can organize an oligopoly. This is facilitated by bidding consortia of companies that would otherwise be each other's natural competitors and who collaborate under some rationale of synergy' (p.776). Again, in invoking the 'natural scarcity' of the 'invisible resource' the slice of spectrum is both small and predetermined as to how it can be used. Yet the justification is also economic. One way of countering the oligopolistic tendencies of limited and well-defined auctions would be to auction more spectrum off. But it is in the best economic interests of the Federal Treasury to maintain that spectrum is scarce: 'Release more spectrum and the price drops' (p.777). The barriers to spectrum access both in price (including technological capacity) and in potential use, maintain the high value of the spectrum.

Noam believes that 'flexibility of entry ... is an excellent way to protect against oligopoly' (p.777). He summarises the situation:

> ... so will existing spectrum holders be united in the desire to stave off new entrants that will not only compete with them for future business but also depress the value of their past investment. Government has a related revenue-based incentive to keep spectrum prices high by limiting supply. Thus, government could become the spectrum warehouser and protector of oligopoly, a function it has played historically.
>
> (Noam, 1998, p.777)

It should be evident then, judging by the limited number of auction participants (six in the 3G auctions, and three in the cancelled datacasting auctions), that the much touted competition policy of the government will inadvertently work against them. The telecommunication companies that have ownership rights over the 3G spectrum for 15 years will band together if a threat to their investment is mounted. The problem is, as we will see in the following section, this is highly likely as new digital technologies have the potential to use the spectrum more 'efficiently', opening up the electromagnetosphere for more wireless communications. 'Scarcity' will no longer (if it does) suffice as the justification for regimes based on 'licensed exclusivity'. That the decision has been made in complete disregard of the opportunities that the impending digitalised mediasphere and telecosm will present is again indicative of the short-term, budget politics of the economic rationalists, or what Andrew Ross has termed 'the 'budget cult' of the postmodern fiscal state' (1994, p.265).

The one avenue that Noam sees as a means to checking oligopolies - antitrust law - is sadly absent from Australia's political and judicial landscape. Although an area outside my expertise, the ongoing project to enclose and privatise more of our electromagnetosphere (or resources in general) clearly brings with it a change in relationship between the people of Australia and the corporations that operate here. Unfortunately, a corresponding move by the government to acknowledge this modified relationship is seriously lacking. The facts are translucent: the Howard government has lowered corporate tax since rising to power in 1996 and instituted a goods and services tax on the citizenry. The notion of keeping the corporate sector in check by legislation swims hopelessly against the current of the incumbent

government's economic determinism. For them, the current economic climate requires quite the opposite – corporate incentive is the catchcry. Lower corporate taxes and the dismantling of restrictions based on foreign ownership are one part of the drive to attract transnational corporate investment. This is to the detriment of the social and cultural aspects that I maintain are crucial to any sound communications policy. Further, it is to the detriment of democracy. As we will see in the following section, a heterogenous, counter-cultural reaction is growing as a response to the government's failure to acknowledge this shifting relationship between Australian civil society and the corporate sector. A sense of urgency is brewing in the populace.

In this segment of the thesis I have attempted to demonstrate the complacency of the auctions regime and the inflections it will likely have on the relationship between the citizenry and the electromagnetosphere. That incisive criticism is now emerging from within the field of economics itself, notably the work of Eli Noam, should be enough to illustrate the precarious future of the spectrum auctions. Yet wherever there are powerful corporate players in the game who are benefitting from the current rules, the critique must also extend to them. In many ways this section has focused on the power elite: the government, their economists and regulatory bodies, and media and telecommunications corporations. This is the elite of the corporatist state. In some ways they are easy targets. I'm sure individually many of them believe they are acting in someone's best interests, be that the Australian public, or their shareholders. But what I have maintained throughout is that they subscribe to a world-view that is too rigid and too deterministic; it is subsequently anthropocentric and unecological, and at times dangerously verges on a reverence for the workings of the free market.

The implications of this world-view should be recognisable: a veneration of resource privatisation, a preoccupation with budget politics, and the increased concentration of spectrum ownership rights, and in turn, power and influence. Worse still, the narrow lens of management and regulation stifles debate and cloaks the possibility of alternatives. As Tom O'Regan has acutely observed:

> So when the Liberal/National Party Coalition government in Australia further ensconses the existing media of privilege by ensuring that

> digital broadcasting and datacasting replicate the existing analogue system with its sharp differentiations between platforms and regulations, and with its use of moratoriums to prohibit the development of new services, what offends is not the spectacle of 'media mates' ordering policy to their own ends (Chadwick, 1989) but the very lost opportunity of these decisions. What seems lost is the opportunity to *creatively respond* to the opportunities provided by the transition to digital and the prospect of an abundant and multi-levelled television and on-line environment [my emphasis].
>
> (O'Regan, 2000, p.5)

It is exactly this 'lost opportunity' which so deeply strikes a chord in those who seek open and diverse communications systems that enhance the democratic traditions this country was built upon. This notion of an entrenched and complacent world-view informing the management and regulation of the electromagnetosphere will strengthen in the sections that follow. It is central to the critique I am building here. Further, and somewhat defiantly, I will outline a creative response to the current status quo. What concludes this critique of the contemporary milieu is an examination of the less obvious undercurrents that are eroding the auctions regime. These are not unified in direction like the forces of corporatism described above, but they each swirl and stir up sediment in their own way, and in turn, contribute significantly to the case against the economic determinism of the regime currently in play.

2.3 Shifting Sands: The Momentum of Technological, Cultural, and Political Discontent.

The subtitle of this section should indicate that a diverse range of contemporary resistance is gathering credence as a response to the faults of the dominant economic world-view, and in turn, the regime that governs spectrum management. Hence this section may seem rather disjointed at first, but my objective here is to illustrate some shared connections and demonstrate that although they lack the unifying direction of the corporatist, managerial regime (which as I have shown, becomes complacent and rigid as a result), they are crucial components of this critique. What follows then is a brief analysis of technological change in the Australian mediasphere, partly because there are excellent introductions to this already in circulation (most recently, Barr, 2000). It is here, also, that I part ways with the work of Noam and Benkler, whose

propositions, I argue, swing too closely to a technologically deterministic argument for opening up the electromagnetosphere. This research will also interrogate the invocation of 'natural scarcity' as a means to justify the current regime, and discuss the implications of a postscarcity world of overproduction.

From here the study swings inwards, examining the cultural and political changes in Australian life that display a resistance to the rising tides of corporatism and the growing need for non-commercialised spaces. Although the connection to the electromagnetosphere is not always a direct one, these arguments will be interpreted as a basic claim for participatory democracy and the need for 'commons' within our social spaces. It is a pertinent contribution to undermining the regime that so arrogantly claims to be representative of all Australian citizens and in the public interest. More directly is the political challenge by the first Australians, the multitude of families and organisations that constitute indigenous Australia, who have implemented the initial steps towards claiming title to the 'invisible resource'. Obviously, the entrenched regime of regulation and management, not to mention the legislative arm of government, is unlikely to accommodate their claims, which will again illustrate the flaws of the system in providing an open and democratic communications infrastructure for an ecologically sustainable society.

The first technological reality to address is the transition from an analogue communications system to a digitalised one, a notion that I have acknowledged at many points in this research so far. Importantly, this transition throws up plenty of dilemmas for the government and its regulatory bodies that work from the paradigm of licensed and exclusive use of a 'scarce resource'. Foremost, a converging and digitalised mediasphere promises a greater capacity for abundant media production and dissemination of images, sound and text across the electromagnetic spectrum, a reality that cannot be accommodated through the regulatory and managerial lens of 'natural scarcity'. The process of convergence involves a blurring of the boundaries between media, telecommunications and computing (Barr, 2000, p.22). For Barr, digitalisation is 'the compression information engine driving changes within these new high-capacity networks of distribution that convergence has made possible' (2000, p.30). Both convergence and digitalisation create and shape the emerging

telecosm, and new technologies subsequently emerge to cope with the new environment of abundance.

Although the telecosm for now will be a combination of wired and wireless networks, I want to turn specifically to the technological developments within wireless communications, particularly spectrum-sharing technologies. These developments include Spread Spectrum and Code Division Multiple Access (CDMA), Time Division Multiple Access (TDMA), Cellular Networks, Frequency Hopping and Packet Switching (Benkler, 1998, pp. 394-400). They have emerged from the computing technology sector as a response to the interference unique to the bustling airwaves of continental United States and Western Europe. Entwined with the argument of 'natural scarcity', the problem of interference similarly shapes the management of spectrum. But now this problem of interference between competing transmitters has driven technological development, and new models of spectrum regulation and management must follow.

Let us consider the spread spectrum transmission techniques to demonstrate the withering of the natural scarcity argument. Spread spectrum technologies convert sound, images and information into 'digital bundles' and transmit them at low power over different frequencies enabling people to potentially send and receive simultaneously (Hughes and Hendricks, 1998, p.82). This development is very different to the broadcasting model where sound, images and information are transmitted at high power across a single frequency. Pertinently, high power transmission lies at the core of interference problems. Generally speaking, this is a conceptual shift then, initiated from within the computing and technology sector, that views the electromagnetosphere as something which has the potential to be shared rather than reserved for licensed and exclusive use. What should be noted though, is that it is a market-based response to a crowded electromagnetic spectrum that is in high demand in both the U.S. and in Europe. Is this market-based response problematic? And can this be transferred to the very different Australian milieu where, although the government will deny it, spectrum is plentiful?

This is where the discussion becomes rather complex. In many ways, the technological arguments for opening up the electromagnetosphere require a

sophistication beyond what I can provide here. There are however, some points to be made. Firstly, just because the technology exists, it does not mean that it should therefore be used. The spectrum sharing technologies are emerging from the digital technology industries that may well have research and development connections to media and telecommunications corporations. They may have agendas of their own in lobbying for legislative change. This is where Eli Noam's 'open-access model' seems to falter, but more because he confuses it with a 'commons model'. The problems with an open-access property regime for the electromagnetosphere, stem from Bromley's assertion that 'a resource under an open-access regime will belong to the party to first exercise control over it' (1991, p.30). Replacing the role of the government with that of a collective of corporations is surely not a desirable outcome, although Noam does not explicitly say this would be the case, and alludes to a role for government regulation (1998, pp. 777-781). To risk a generalisation, it would be disingenuous to complement or replace the economic determinism of the current regime with the technological determinism of another.

Regardless of the finer details of the property regime set to dictate rights and access to the electromagnetic spectrum, the reality is that as a result of these spectrum sharing technological innovations, the United States government have allocated spectrum for an unlicensed National Information Infrastructure (U-NII). It was indeed this allocation that prompted the arguments from both Noam and Benkler in 1998. Although the possibility was raised, for now Australia has no plans for a similar allocation for unlicensed use (ACA, 2001). Inertia has smothered the case for this important experiment in the Australian wireless environment.

This is by no means an exhaustive deliberation on the technological basis for a shift in spectrum regulation and management. In effect, the technological arguments put forth by both Noam and Benkler are both dense and multi-faceted, and originate from the complicated and very different American communications environment. Moreover, each are Professors of Law and Economics respectively at their American universities, and their discourse is couched in legal and economic jargon. Nevertheless, my intention here is to emphasise that the technological means for a regime based on sharing spectrum as opposed to the contemporary paradigm of exclusive use, now exists. Now this does not by itself provide the impetus for

regulatory change – the Australian government and the ACA, for instance, are well aware of these developments. What needs to be understood however, is that in allocating spectrum for experimental unlicensed use, technological development within an unlicensed and decentralised wireless communications environment can take place. The choice for Benkler is therefore between a reliance on 'centralised control by identifiable organizations, or on multilateral coordination among numerous users' (1998, p.292). Without this incentive, and without addressing this basic choice, technological developments will continue to serve the current centralised model to the detriment of a future where an open and diverse telecosm can enhance participatory democracy and encourage an ecologically sustainable society via multi-levelled and localised wireless networks.

Invoking the argument of 'natural scarcity' is simply without basis in light of these developments, yet it persists in the narrow economic world-view of government, regulators, and, when it suits them, the private sector. The problem is, in this age of late capitalism, we face an increasingly abundant contemporary situation, where over-production, and in the case of spectrum, technological change, now demand that we come to grips with the implications of 'postscarcity'. Unfortunately, as Ross has observed, 'we have seen economic rationalism reinstitutionalize scarcity as a universal condition, rendered tolerable only by the profitable manipulation of markets designed to address the imbalance between supply and demand' (1994, p.270). In the case of spectrum regulation and management, the equivalent of 'supply and demand' is the existing congestion within the various frequency bands and the 'profitable manipulation' being the maintenance of scarcity to obtain high bids in auctions. Economic determinism is again flying in defiance of the technological means for a regime that could potentially acknowledge and engage with the realities of a postscarce world.

I want to demonstrate here how the notion of postscarcity links with the remainder of this section. The ramifications of the claims of 'natural scarcity' are what motivates the incisive conclusions of Andrew Ross in The Chicago Gangster Theory of Life (1994). For him, a discourse of 'natural limits' 'can be used to support discourses of social limits' - a 'rollback' on the hard-fought freedoms of the various liberatory movements of the last half of the twentieth century (1994, p.266). Is this

intrinsic to the rigid framework of economic determinism that is gate-keeping the electromagnetic spectrum? Does the invocation of 'natural limits' as a basis for regulating the electromagnetosphere carry with it an implicit undercurrent of 'social limits'?

There is a groundswell of protest and dissent that suggests this may be the case. From the rural and regional heartlands of Australia to the student protest movements of our nations' universities, opposition is growing to the international face of economic determinism. That heavily loaded and highly contested term 'globalisation' has accumulated its fair share of detractors as the nation-state struggles to balance possibly the central conundrum of the globalised world: international economic agreements and domestic social policies. Dissatisfaction with mainstream politics is commonplace as the Australian public turn to minor parties that offer opposition to the determinism of economic globalisation. One Nation have tapped the dissatisfaction in rural and regional Australia, and the Greens likewise with the increasing support from city-dwelling young people. This very broad and divergent resistance perceives a generally deleterious effect on democracy and society stemming from the increasing commercialisation at all levels of social life. This will often manifest directly as opposition to privatisation, with the potential sale of Telstra providing the best example of this resistance in rural and regional Australia.

As a young university student, my experiences and political position are informed by the loose group of resistance to economic globalisation that is developing here and in other cities around the world. I want to demonstrate here how this fluid position ties in with spectrum regulation and management in Australia. Firstly, the counter-cultural arguments and activities of this resistance reveal a sophisticated understanding of the connections between mainstream media, government and corporations. 'Culture-jamming' in all its forms - from computer hacking to subvertising, from student films to hip-hop – exhibits this heightened understanding and questioning of what life is like in a commercialised culture. Yet this loose-knit counter-culture (as in times past) is not institutionally bound, and is not necessarily united ideologically. The actions of its members and supporters are quite simply a creative response to the reality of the corporatist state.

In recent times one writer has emerged who has encapsulated much of this position. Naomi Klein's popular book No Logo (2001) sought to pin down the growing resistance to the commercial enclosure of public spaces, among other things, and tap into this heterogenous social movement. In many ways, Klein is rallying against the 'discourses of inevitability' that the power elites of the corporatist state – the 'space invaders' as she calls them - invoke as they consistently commercialise everything from 'youth culture', to schools and universities, to the body itself. She posits one interesting observation that elucidates my argument here. Klein believes that the 'political models in vogue at the time of the invasion' – the politics of representation – were insufficient for dealing with 'issues that were more about ownership than representation' (p. 124). She continues: '[w]e were too busy analyzing the pictures being projected on the wall to notice that the wall itself had been sold' (p.124). This illustrates two certainties. Firstly, it presents a convincing case for a shift in the political tools of analysis; a shift from analysing the content to analysing the 'space', or the channels, or the medium, where the content is actually seen or heard. Secondly, and more insidiously, it illustrates the frantic pace of enclosure: the commercialisation of 'space' is moving so quickly that tools for critical analysis in universities are struggling to match its momentum. This research acknowledges and engages with this shift. Hence, the critique here has focused on the regulation and management of electromagnetic 'space', rather that the content that is transmitted across it.

One final, and more concrete example from this broad field of resistance is the work of filmmaker Craig Baldwin. In his collage-essay film Spectres of the Spectrum (1999) Baldwin specifically addresses the colonisation and corporatisation of the electromagnetic spectrum . David Cox (2001) has written at length on Baldwin, and claims that through these techniques of 'cut-up film-making' his work 'comments on the circumstances of its own production' (p.68). For Cox, Baldwin's conclusion is clear: 'electromagnetism is a free energy source, which should be available to anyone' (p.68). This is possibly the most direct critique of the framework that governs the regulation and management of the electromagnetosphere using the tools of the 'culture jammer'.

Intrinsic to the cultural and political concerns of the emerging opposition to globalised, economic determinism, is the role ascribed to indigenous cultures in this transition to a new global information order. At many levels, the rights of indigenous cultures are perceived as an obstacle to be overcome, and tokenistic gestures are the general result. Hence, the issue of indigenous rights to the airwaves is complex. But rather than intervening in any legal discourse, this study seeks quite simply to maintain that the electromagnetic commons remain free from private ownership. It is also my conviction that indigenous knowledges and narratives are a vital part of any ecologically sustainable society. The pressing issue here would be a unification of indigenous rights to the eco-sphere (of which the electromagnetosphere is one part) with the concepts of social justice and ecological sustainability. This is not to claim that indigenous cultures are inherently ecological per se, but to recognise the parallels with Shiva's early (modern) understanding of 'resource': that notions of respect, responsibility and reciprocity are inherent to the condition of indigenous 'resource management'.

The success of a Maori claim to airwaves in New Zealand last year has set off a similar claim here in Australia. The Maori argument is based on the dominant perception of spectrum as 'a resource', and that under the Waitangi Treaty of 1840 'Maori have a claim to that resource just as they have a claim to fishing or mineral rights' (Dodgson, 2000). In the absence of a treaty between the Australian government and indigenous peoples, the Australian debate will unravel differently, but nevertheless, the precedent has been set. There is no doubt that the ecocultural tools of decolonisation and deterritorialisation would find symmetry in these claims. And in the interest of our future, both in communications and ecologically, we should track these ongoing developments with a critical eye. That these claims have reached a stasis should be enough to demonstrate that the contemporary regime of spectrum management is incapable of either recognising the rights of the first Australians to the electromagnetosphere, or incorporating them into a long-term plan for an open communications system.

As a spokesman for Senator Richard Alston has so eloquently stated recently: "We are in discussion with the ACA about how best to allocate spectrum to ensure it delivers the best possible outcome for consumers and taxpayers" (cited in Mitchell,

2001, p.27). This is the rhetoric of economic determinism writ large. 'Consumers' and 'taxpayers' are narrow definitions of the role citizens are to play in an open, diverse and democratic society. Subsequently, the significance of the electromagnetosphere to society, culture and democracy is dangerously downplayed. This section has established the antagonistic undercurrents that swirl beneath the veneer of the progressive, modern and democratic nation-state. A heterogenous response is surfacing to counter the determinism that our power elite purport to be inevitable, and, although it lacks cohesion, the voices in support of the common good and the common wealth, can only be discounted for so long. Can this debate be reconfigured to incorporate 'best possible outcomes' for citizens (including rural and regional denizens) and our ecologies? Is there a political regime for the electromagnetosphere that can address these concerns, take them on board, and direct us in the best interests of democracy, cultural diversity, ecological sustainability and an open, decentralised communications infrastructure?

Chapter Three. The Electromagnetic Commons: An Alternative Regime

The notion of an 'electromagnetic commons' is not a radical, utopian alternative system of property rights for governing the regulation and management of the electromagnetosphere. Far from it. Both Eli Noam (1998) and Yochai Benkler (1998), distinguished professors from respectable American universities, have put forth an elaborate and detailed argument for the 'electromagnetic commons' as an economically and technologically viable alternative to the contemporary regime. Both are obviously intelligent, credible and creative thinkers, and experienced in the field of communications. Moreover, the American government has legislated an 'electromagnetic commons' – the range of frequencies that make up the U-NII. This is worth noting up front. Subsequently, a blueprint exists, and has been in place for a few years now, and the developments and outcomes of this experiment in wireless communications are readily available from the FCC. This is therefore not a new idea.

I want to illustrate within this section that, on top of the existing U-NII blueprint, the commons concept has inherent contemporary currency, particularly in the age of the Internet, which is itself a form of 'the commons'. The Internet has revitalised the notion of 'the commons' particularly within this technological environment of shared software, 'open source data', and public domain standards such as TCP/IP (Benkler, 1998, p.291). The notion of a 'digital commons' is therefore a 'modish' one particularly within the 'free software movement' (Narula, Sharan, and Sengupta, 2001, p.1).

However, as I have demonstrated in the previous section, the basis for an 'electromagnetic commons' cannot be founded on a purely technological argument. As I will show, the concept itself can become contorted. What is needed is a complementary counter-claim that will promote a social and cultural dimension and by definition, keep the more deterministic strains of the technologists in check. More critical to this argument then is the consistent applications of 'the commons' in both theory and practice from within the ecology movement, which predate these more recent claims outlined above. This diverse social and political movement, as with the many non-governmental organisations associated with it, seeks to reinstate and redefine notions of the common good and the common wealth, and as such, 'the

commons' as a property regime is promoted as the most useful model for governing public 'resources'. However, the commons model is not complication-free and some strong counter arguments have been mobilised, as we will see. Hence, my objective here is to unify these two very different movements in a complementary fashion to bolster the intellectual case for a commons regime in spectrum management.

What I intend to outline firstly though is a brief history of 'the commons' in Western politics, economy, and thought. And this history is indeed detailed, contested and most importantly, shapes our contemporary understandings of the concept. Indivisible from a history of 'the commons' is the enclosure movement – the transformation of commons to private property – and this will similarly be contemplated and examined. In short, the 'commons' and enclosure carry with it plenty of historical baggage and as such this needs to be unpacked. This history will not be completely accounted for here, and is by no means exhaustive. It is what you might call a well-worn track. The aim however is to provide a foundation for discussing the contemporary currency of the concept, which will follow this brief historical overview.

The final section will then attempt to unify the technological case with a consolidated ecological dimension that allays any tokenistic measures. This can only be achieved, I will argue, by forging a localised and bioregional network of unlicensed, wireless networks that will subsequently furnish a creative direction for a communications policy predicated on ecological sustainability. This will in turn provide a springboard for my conclusions, which foresees a framework of 'the commons' as a property regime well suited to the management of the electromagnetosphere in the digitalised telecosm of tomorrow's Australian communications infrastructure.

3.1 Digging Deep: A Brief History of the Commons and the Enclosure Movement

Ideas of common property, the common good and the common wealth run through the history of Western thought and the democratic tradition. In many ways, the Western intellectual tradition constantly returns to these ideas as both a basis and a

stimulus. Common property, however, has thrown up more than its fair share of questions. The prevailing mindset has revolved around the essentially problematic concept of common property. At daybreak in the Western, democratic tradition, Aristotle recognised the trouble that common property attracts when he claimed: 'that which is common to the greatest number has the least care bestowed upon it' (cited in McCay and Acheson, 1987, p.2). With the transition to the modern age many centuries later, this idea was extended and congealed, leading to the enclosure of the Old World commons that had for centuries sustained life in Medieval Europe.

Subsequently, the drive to colonise and the endeavour to enclose the electromagnetosphere has thick and extensive historical roots that sink deep into the soil of the past - at least five hundred years to medieval England. The enclosure movement is often referred to as 'the tragedy of the commons', a phrase first coined by an avid proponent of commercial enclosure, the philosopher Thomas Hobbes (Jagtenberg and McKie, 1997, p. 14). It is predicated on the enclosure, privatisation and commercialisation of land, of space, or more directly, of an ecological region. The seizure of a common and shared land (or space) that communities had lived and worked with for many generations was indeed tragic for rural communities of the times. It also marks the emergence of a central feature of the space-power relationship so familiar to us today, the concept of private property. In what some historians have described as 'the revolution of the rich against the poor', landowners and the emerging mercantilist class enclosed the shared commons through subdivision in the pursuit of larger profits, more land and greater power (cited in Rifkin, 1991, p. 39).

As the new, digital communication technologies of today will modify our relationship with the electromagnetosphere, the printing press as a communication technology transformed the relationship with 'the commons' by facilitating the enclosure movement. Title deeds and rent agreements replaced traditional, oral agreements, legitimating the monetary economy and the intensification of agricultural practices in the quest for profit. Accordingly, the enclosure of 'productive' ecological regions ensued. As the movement gathered momentum, political and legislative measures (also facilitated by the printed document) solidified the new arrangement in the communities of England and Europe, establishing the

familiar rule of law and the sacredness of private property we understand so well today. These measures 'fundamentally altered the economic relationship between people, and between people and the natural environment, paving the way for the emergence of the industrial and urban revolutions' (Rifkin, 1991, p. 39).

Yet the changing power relations of communications presented a paradox: they contributed to a better balance of power and a rejuvenation of participatory democracy when compared to the feudal social structure. So on the one hand the printing press fuels the engines of enclosure, industrialism and capitalism, while on the other it simultaneously liberates: it would provide the means for 'the people' to challenge and in some cases, break the very shackles of religious and political domination. Levellers and Luddites, anarchists and revolutionaries, fall into this broad category of resistance.

We are now witnessing a similar organisation of economic and cultural activity around new communication technologies in our own times. The explosion of microelectronics and computing communication tools – both wired and wireless - similarly intensifies the dominant ideologies and actions of our modern corporatist world. But like the printing press, the other edge of the sword glistens in the sunlight: again the tools of the dominator can be harnessed by the dominated. Hackers, culture-jammers and cyber-terrorists are the new face of the resistance, although their motives and enemies are essentially the same as the earlier manifestation mentioned above. Yet this may imply that some sort of balance or dialectic is at work, that one keeps the other in check. The propulsion of the enclosure movement and its virile relatives - industrialism, capitalism, and colonialism - is indeed vigorous. This cannot be overstated. A comprehensive understanding of the history of the West would make this intelligible. Resistance to domination is always conducted uphill.

The history of commercial enclosure is therefore an evolving meta-narrative of power over space, of domination of an elite over the oppressed and of structure and order over a chaotic and unpredictable nature - a subjugation of nature (or space) to market forces. Moreover, it is the subjection of land, space and ecologies to the cause of capitalist enterprise. As Raymond Williams (1980, p. 78) has so aptly stated, for a

period (the eighteenth century) so concerned with order, the enclosure movement was "notably disorderly and corrupt" (p. 78). He asserts that:

> [O]ur first really ruthless capitalist class, taking up things and men [sic] in much the same spirit and imposing at once profitable and pauperising order on them, were those eighteenth century agrarians who got themselves called an aristocracy, and who laid the real foundations, in spirit and practice (and of course themselves joining in), for the industrial capitalists who were to follow them.
>
> (Williams, 1980, p. 79)

For Illich though, this 'fundamental form of environmental degradation ... which coincides with the history of capitalism ... can in no way just be reduced to it' (1982, p.9). So although this roughly marks the origins of a powerful, capitalist appropriation of ecological space that has clear-cut the path for the profound ecological consequences we find in today's world, it must be noted that the degradation runs deeper than purely the application of an economic abstraction. The tragedy that is the 'enclosure of the commons' is complex and multi-dimensional.

It would be more useful then, to see a cultural rift dividing the natural world and the social world of the community, as this will to dominate space and nature became an ideological, philosophical and, arguably, a religious framework for the hegemonic order: a mutually reinforcing framework predicated on the increased concentration of wealth, space (or land) and power in the hands of a privileged, patriarchal elite. This is similar to Carolyn Merchant's (1980) thesis on 'the death of nature' where a 'mechanistic' world-view supersedes an 'organismic' one. Subsequently, the rural communities who shared and lived closely with the land for centuries were forced into a new relationship with the natural world vis-à-vis the urban industrial town and city. The 'world of nature' falls to a crude form of 'management' – founded on reason and manifested in the scientific method – and became a colonised space, exploited and appropriated towards cultural, political and economic ends. The social world, innately tied to the ecological world, again turns further from sustainable, pre-capitalist modes of organisation, and towards a mythical place independent from nature. It is against this background and in this heightened phase of enclosure, that the interconnected eco-regions of atmosphere and electromagnetosphere were colonised.

3.2 The Currency of the Commons: Technological and Ecological Dimensions

There are two dimensions to the contemporary use of 'the commons' that I wish to examine here: the technological and the ecological. This is by no means an effort to reduce the use of the concept to these two areas, as the commons, much like the common good or the common wealth, seems to run across the breadth of all concerns with, in this case, propertied relations. It is simply to focus my discussion as each relates to the electromagnetosphere. In the last half of the twentieth century the concept of the commons has become tangled and twisted, and is often discussed as if it somehow existed in a vacuum. Social and cultural context is therefore crucial to invoking the idea. So this is also, in part, an engagement with concepts and language. David Bromley stresses this need for clarification in scholarship when he claims that 'it would be difficult to find an *idea* (a concept) that is as misunderstood as that of the *commons* and *common property*' [original emphasis](1992, p.1-2). This is particularly pertinent in discussing the recent emergence of the idea within technological circles, but also, as we will see, within the ecology movement. Initially then, the discussion will demonstrate the basic technological currency of the idea, and secondly, it will show how it has been uprooted from its historical and ecological context, reworked, and then released into the mythic artifice of cyberspace.

The Internet has fragmented our ideas of information and communications in the globalised, electronic world. Some see the Internet as a 'global information commons' that requires new models from communications policy, and they are probably right. Importantly, the Internet has brought the best and worst of humanity into the open, exposing us to the contemporary contradictions of modern life that had hitherto occupied the cultural margins. This is one part of the great 'paradox of modernity' that Giblett analyses in relation to the car as a communications technology (2000, p.15). I have noted this aspect of the Internet in a previous article in claiming that it may 'open up a crucial space for new ecological knowledges and understandings that are independent from the institutional operations of the traditional media' (Smith, 2001, p.64). The cultural significance of the Internet to communications and society in the industrialised world is unmistakable.

So how has the inflection of the Internet stimulated ideas around the 'digital commons' and the future of a communications system that draws on the energies of the electromagnetosphere? Peter Huber (1997), an experienced commentator on American communications policy, sees the expanding, fragmenting telecosm (of which the Internet is the progenitor) as demanding an upheaval in how we think about communications, and more importantly, in how it is regulated and managed. He posits the rather radical call to abolish the FCC altogether and allow common law to govern the use of the spectrum. Huber believes that we must 'throw open the market' and do away with the interfering hand of a centralised government commission (p.6). Accordingly, he maintains that 'the airwaves should be privatized, quickly and irrevocably' (p. 72). As a result, 'technology and the market may transform the airwaves back into a public commons after all' citing that 'private markets create shared spaces, too' (1997, p.74). This notion of creating a commons through the twin emblems of technology and the market is broadly representative of the technological argument. On the one hand, the argument taps into the idea of 'sharing' so prevalent to the growing telecosm – in software, protocols, and technology – while on the other, it illustrates the assumptions and prejudices that lurk beneath the case for privatising the airwaves.

The ideological positions that underlie this blind faith in market forces and the belief in the neutrality of technology cannot be left unchallenged. It is precisely this argument that drives much of the hype around the so-called 'new economy'. And the source is pretty much the same: the American technocratic elite. Again, like Noam, the technological case for the 'digital commons' is actually promoting an open access regime – a frontier where anything goes - and confusing this with a commons regime, which requires co-management at the local-authority level. The idea of a new 'frontier' of the telecosm (both wireless and wired) obviously appeals to the competitive and entrepreneurial spirit of the American technocrats. Subsequently, it is not that far removed from the rhetoric of neoliberalism, corporatism and economic rationalism that guides our current regulation and management of the electromagnetosphere. Clearly then, in the interests of participatory democracy, and by definition, social and ecological justice, this is not only a misuse of the commons concept, it is a derivative argument, loaded with the ideological assumptions of an increasingly internationalist, privileged and technocratic elite.

It is particularly the work of Huber (and to an extent, Noam and Benkler) that has fostered this techno-enthusiasm for the concept of the 'digital commons'. Mute Magazine (www.metamute.com) devoted a recent issue to looking at this 'modish' concept in the context of the Internet and the 'free software movement'. In that issue an interview with James Boyle, a 'maverick' law professor and intellectual property specialist, details some of the finer intricacies of making the connections to the concept of the commons. Boyle claims that 'our particular ideas about property are very much up for grabs' and that the Internet 'may represent a story in which we end up better off with less centralised control, one in which strong property rights might actually be bad' (2001, p.6). Boyle canvasses a diverse range of issues that arise from the conceptual mobilisation of 'the commons', illustrating the complexity of an idea that has crossed from the ecology movement to the free software movement, and from British to American law (where 'the commons' has no legal recognition). To his credit, he manages to traverse this gap quite well, exhibiting the flaws in each of their arguments and sidestepping the certainties of the technological determinist.

It would be wise to use Boyle to bridge this technological trend (towards the use of the 'digital commons') to the application of the commons in theory and practice from within the environmental/ecology movement. It is firstly worth noting Boyle's observation that 'if there is a line between the Enclosure Movement and the commons and the fights of the fourteenth century through the nineteenth century, on the one hand, and the environmental movement, on the other, it's not a straight line' (2001, p.4-5). This is clearly worth considering here when discussing the management of a 'resource' which has only 'existed' in the twentieth century. Moreover, it is a different playing field, as the Western world of the twentieth century is in many ways the manifestation of the Enclosure movement. The environmental/ecology movement has grown here within this enclosed part of the world. Its arguments and battles are conducted from within it.

One of the deviations in this line that links the resistance of the English countryside to the modern environmentalist, has been provided by 'the tragedy of the commons' thesis, first espoused by biologist Garrett Hardin in an article in 1968, and reprinted many times since. The thesis, which basically claims that common property fosters

inefficient resource use, has had a profound effect on the idea of the commons and resource management across a wide range of disciplines and regions of the world. It can be viewed as springing from the rising economic world-view of the post-war era, and as such is a cornerstone for economists concerned with property and resource use, and a site of contention for the ecology movement. Benkler notes that the 'tragedy of the commons' effect even raised the concern of the FCC in their consideration of the U-NII proposal (1998, p.294). The thesis is a dominant metaphor for arguing against the mobilisation of common property regimes in resource management. Because of its biological basis it has proven to be a stubborn and divisive thorn in the side of the ecology movement. Subsequently, proponents of ecological sustainability have had their work cut out for them in reclaiming the concept of the commons.

There have been many efforts to reclaim the commons from Hardin's claim that common property regimes lead to inefficient use and overexploitation of resources. Firstly, the British arm of the movement, who have a strong historical and legislative link with the commons, has consistently sought to counter the dominance of the 'tragedy of the commons' thesis. This has mainly been through the pages of The Ecologist, which in 1992 devoted a special issue to the commons which attempted to outline the trajectory of enclosure from late medieval England to industrialisation and colonisation, and through to the post-war concept of 'development' and the establishment of the global economy. In addressing the global economic expansion of the West they have increasingly turned to the 'developing' world, and, particularly with the help of anthropologists and ecologists of these regions, have demonstrated the prevalence of common property regimes through a wide range of indigenous economies. They remind us that:

> From urban slum dwellers to peasant farming communities, the bulk of humanity depends on the commons for its livelihood. Neither open-to-all nor privately-owned, commons regimes involve more than a system of property rights. They provide a political space where communities are able to define themselves and where the power of any one group or individual can be held in check. Their success in protecting their environments depends on the community maintaining its authority.
>
> (The Commons, 1992, p.123)

A thorough attempt has been launched to demonstrate that private property is inherently a Western concept, and that the majority of the world often operate efficiently and sustainably in using common property regimes, from the crowded street markets of Bangkok, to the fields of Ethiopia, to the fisheries of Iceland (McCay and Acheson, 1987). This is therefore a project to reclaim a 'political space' for local communities and to 'reclaim authority' for local, participatory decision-making. For writers like George Monbiot (1994) the real tragedy is therefore enclosure, not the commons. The pressing question would be: can this work for communities within Australia who are only familiar with the enclosed world of private property and the centralised decision-making of a federalist political system?

More recently then, the idea of 'reclaiming the commons' is mobilised to counter the supposed inevitability of globalisation. David Cromwell continues the British tradition of linking enclosure to globalisation when he claims: '[i]f there is ever going to be a healthy, just and ecological future, we must comprehend, then overturn, the corporate-driven mechanisms by which the transfer of public resources into private hands is taking place' (2001, p.44). This transfer is maintained by 'the illusions that conceal Western complicity in abuses of human rights and the environment' (p.44). This returns us to the focus of this research because 'the illusions' are the sources of information that shape our world-views: the mainstream media of the Western world. And if this illusion is currently managed by the mass media, imagine how difficult it would be if the very channels – the electromagnetosphere – was to become the private property of these very corporations. Cromwell continues by claiming that:

> The overwhelming message carried by the mainstream [media] is that corporate activities are largely benign and certainly not worth systematic investigation. This deception is entirely consistent with the corporate nature of the global media industry. Would we seriously expect the corporate mass media to rigorously examine its own integral role in a coercive system that plunders the planet and destroys communities?
>
> (Cromwell, 2001, p.44)

Clearly, if we allow the one increasingly critical resource to our communications future - the electromagnetosphere - to fall into the hands of the media and telecommunications corporations, we can expect the abuse of human rights and the environment in the 'majority world' (the so-called 'developing world'), and the maintenance of the illusion of 'benign globalisation' in the West, to persist in this conflicting dualist form. This will be to the detriment of ecologies across the planet.

Ultimately, we can only take steps away from this impending course by working from within our own nation and our own communities. That maxim of the ecology movement to 'act locally and think globally' must be affirmed and maintained as we direct our energies towards retrieving the commons of the electromagnetosphere. Our local commons - the resources and spaces that we collectively share - must be reclaimed as a precursor to the pursuit of the wider goal of reclaiming the global commons. Social and ecological justice may gather momentum as a result of this reinstatement. Similarly, a redefinition of what the common good and the common wealth mean to local communities, rather than to economists who advise the government, can only be realised through the responsibility that common property regimes demand from the community. Only then may we rediscover Shiva's original concept of the 'resource', and, just maybe, become responsible and grateful stewards of the natural world.

3.3 An Ecocultural Vision: Bioregions and Wireless Local Area Networks

In discussing the diverse and cross-disciplinary nature of resource management and communications policy, it should be obvious that no single application of a property regime or an economic abstraction for that matter, can simultaneously change the course of the role citizens are to play in the telecosm of Australia's future. The project to reclaim the commons can only spring from the grassroots. What I want to outline here though, is a creative alternative to the dominant paradigm of spectrum management that I believe can accommodate some of the concerns that this research has raised. It is by no means an exhaustive blueprint that will solve the dilemmas that face Australian society in the years and decades to come. It should be seen more as an ideal model to work collectively towards. There is still much work to be done

across the range of disciplines involved and across the various levels of government in Australia.

As I claim in the introduction, to a large extent, the environmental/ecology movement has failed to address the role of communications technologies and infrastructures in the shift to ecological sustainability. Technological discussion is rare, and usually limited to debates concerning biotechnology and genetically modified food, military applications and the nuclear industry, and occasionally the corporate structures of the global media (see for example, Suzuki and Dressel, 1999). There is a distinct absence of creative engagement with the reality of many Western cultures: that media and technological communications are intrinsic to our lives, it is a major source for defining ourselves as citizens and for engaging in political life, and, importantly, for defining our relationship within the natural world.

Likewise, our attempts to grasp our contemporary cultural and ecological maelstrom are played out in our communications media. The understanding that I'm working from here is that 'the public realm and the public' are now to be found in the popular media of television, newspapers, magazines and photography. This is 'the place where and the means by which the public is created and has its meaning' (Hartley, 1992, p. 1). If Hartley's claim is even partly correct, the Australian 'publics' and 'public realms' of our communications media, cannot be discounted in debating the momentous changes to both our mediasphere (and telecosm) and ecologies in the coming decades. It is the 'popular' mediasphere that acts as a locus for cultural meanings and debate - for making sense of the world. Our understanding of, and communication with, our ecologies are highly mediated. It is our mediaspheres – our public spheres – that are the locality for canvassing our future challenges, strategies and problems. The pressing question would seem to be whether this is possible in a completely corporatised mediasphere. Could the provision of spectrum for local communities to broadcast their own stories and narratives hasten our shift into more ecologically sustainable modes of living?

An ecocultural blueprint for spectrum management would involve the unification of the ecological concept of the bioregion to the technological concept of the wireless local area network (LAN). The bioregion is best defined as 'an identifiable

geographical area of interacting life systems that is relatively self-sustaining in the ever-renewing processes of nature' (cited in Giblett, n.d., p.6). Where the complexities arise are in the extension of the concept into a political philosophy, an objective most rigorously developed by Kirkpatrick Sale. Hence, the bioregion is now an accomplice of 'bioregionalism', and this cannot be left unacknowledged. Having refined the concept of 'bioregionalism' over a few decades now, Sale has most recently affirmed the philosophy as:

> a way of living and thinking which views the world in terms of the actual contours and life-forms of the Earth – measured by the distinct flora and fauna, the climate and the soils, the topology and hydrology, and how all these work together: regions defined by nature, not legislature.
>
> (Sale, 2001, p.41)

Yet Sale's efforts are not without detractors. Andrew Ross (1994) was quick to see the spectre of 'biological determinism' that loomed beneath the bioregional philosophy. Giblett (n.d) has similarly picked up from the arguments of Ross, warning that the shift to 'a fully-fledged political philosophy is fraught with danger' (p.9). Yet where Ross is pretty much content to critique, Giblett hastens to reaffirm the usefulness of the 'bioregion' to the ecology movement. He believes that:

> the value of the bioregion lies not only in making connections with a larger sense of place in which one lives and on which one depends, but also in reconstruing a sense of community from a narrow, stultifying human community to a broader and richer sense of community for all beings.
>
> (Giblett, n.d., p.9)

Importantly though, we would need to extend the bioregion to include the electromagnetosphere (and even orbital extra-terrestrial space) as Giblett has also noted (2001, p.148). Paying close attention to developments in the science of bioelectromagnetics could assist this. As their research is increasingly demonstrating that electromagnetism permeates and regulates all earthly life, the concept of the bioregion will have a pertinent role to play in reclaiming the 'invisible resource' from the narrow and anthropocentric regime that currently manages it. By linking it to the wireless LAN, and managing it as a commons, the bioregion could guide both

the management and use of the airwaves. These networks, which would be accordingly unlicensed and the responsibility of both the community and local government, will find suitors in the non-governmental realm of community, volunteer, and charity organisations: the very organisations that claim to act in the interests of the common good and the common wealth (or non-profit as opposed to for-profit).

This 'greening' of spectrum management would stimulate and channel a wealth of scientific bioregional information from flora and fauna to climate, geology and so forth. Local environmental issues will also have space to be canvassed independently which will enhance conservation, preservation, activism and democracy within these communities. And, just as importantly, there will be incentive and space for our narratives and stories which seek understanding and harmony in the places we live, work and play, in turn opening the way for traditional (and modern) indigenous narratives of life within the bioregion. In releasing this diverse range of scientific, political and philosophical communications, which would be, by definition, non-commercial, fears of plainly tokenistic gestures towards ecological sustainability can be averted.

Clearly though, there is a role for government to play in the future of communications in Australia. In the interests of democracy, social and ecological justice, and a re-investment in localised communications, the private sector cannot be left to work alone, as these concerns will be insufficiently addressed. Citizens only have a role where there is some sort of government structure: without it we are simply consumers. Yet some sort of balance must be achieved and this can only happen by returning authority to the communities and local governments of our nation. I am convinced that a common property regime for the electromagnetosphere is the only regime that can facilitate this shift. The national, centralised model for spectrum management does not make sense by both measures of the technological and cultural arguments. The move to privatise the spectrum completely would have far-reaching and disastrous consequences for our notions of citizenship, democracy and society. It must be allayed at all costs.

If we view the unification of the bioregion to the wireless LAN as an objective to be worked towards, then some intermediary measures are required. This unification would obviously be a long and complicated process, as it would need to work 'uphill' – from the grassroots. One important transitional step would be to 'zone the resource' as Harvey Jassem (1998, pp.22-25) has suggested. This implementation is necessary, as it will provide the space in the electromagnetic spectrum for a vital cultural experiment in unlicensed use. As it will be restricted by low power transmissions to local areas, it will also be a technological experiment. Crucially, an incentive will arise for the development of alternative communication technologies and networks to link them to each other, which may in turn, stimulate local economies, employment and research. As the majority of technological developments are channelled into accommodating an exclusive national and centralised communications system, the zoning of an unlicensed 'slice of spectrum' cannot arrive fast enough.

For Jassem, 'zoning' would recognise that the electromagnetosphere is 'large enough to accommodate all users, but complex enough that it will be zoned in order to maximise the benefits accruing from it' (Jassem, 1998, p.22). Now although this would obliterate the notion of scarcity – that domineering concept that is invoked to hoard spectrum and maintain its high economic value - the government and other arms of the corporatist state may take comfort in Jassem's claim that 'zoning often enhances private property values' (p.24). Obviously then, this research grudgingly recognises that the move towards enclosing spectrum into private hands will most likely proceed. But a complementary policy must follow this shift and this would involve recognising the importance of communications to the social fabric and to the prospects of an ecologically sustainable future. We need to look beyond the bare economic value of the electromagnetosphere as see it as an inherently valuable 'resource' for culture and society. We need to decolonise and deterritorialise the spectrum and claim at least some of it for the common good and the common wealth, for culture, society, democracy, and the future.

CONCLUSION

In summary, it would be wise to reiterate just how pressing the issue of 'privatising the airwaves' really is. As Rifkin (2001) reports in April this year, the pressure is mounting on the U.S. Congress, the FCC, and the President to seriously consider exhaustive privatisation of the electromagnetic spectrum in the United States. In appealing to notions of economic efficiency, substantial revenue for treasury and less responsibility for government, the proponents of privatisation know they have a solid case. But, as I have argued throughout this thesis, the argument is both irresponsible, deterministic, and in complete disregard of the central place that communications systems occupy in relationship to citizenship and democracy. Subsequently, in the globalised world where international economic agreements are enshrined and agreements on ecological sustainability, social justice and cultural diversity are not, the privatisation of the electromagnetic spectrum is potentially a threat to the very future of Western democracies, and equally to the rights of the 'majority world' to self-determination.

And threats to democracy are ultimately threats to the prospects of ecological sustainability. Australian citizens and non-governmental organisations therefore require an open and diverse communications infrastructure to grapple with the ecological challenges of the future, both at the local and global levels. We need an unlicensed spectrum zone - an 'electromagnetic commons' – on the agenda when we discuss the future of the Australian media and communications environment and of Australia.

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